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DESIGN FOR A NORMAN VILLA.

THE

MODEL ARCHITECT.

A SERIES OF

ORIGINAL DESIGNS

FOR

COTTAGES, VILLAS, SUBURBAN RESIDENCES, ETC.

ACCOMPANIED BY

Explanations, Specifications, Estimates,

AND

Elaborate Details.

PREPARED EXPRESSLY FOR THE USE OF

PROJECTORS AND ARTISANS THROUGHOUT THE UNITED STATES.

BY SAMUEL SLOAN, ARCHITECT.

IN TWO VOLUMES.
VOL. I.

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SAMUEL SLOAN,

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PREFACE TO THE FIRST VOLUME.

The present work was undertaken with considerable deference and not without forethought. For some time previous to its commencement the author had been engaged in preparing designs for a large number of country residences to be erected in widely distant places, and was forcibly struck with the great want of information displayed by those concerned in these matters. It is true that much has been written and read on the subject, and a great number of handsomely engraved designs on fine paper have been presented to the public, threatening annihilation to the architect's bill, but no one knows so well as he who has trusted in these promises, the difference between a beautiful picture and a comfortable dwelling. In short such works as have come under notice are quite inadequate to the end proposed. They inculcate very false ideas in the general reader, and give to the builder no new or valuable information. They are much better ornaments for the centre table, than guides to a practical man.

Impressed with these views, the author was led to believe that the production of a "matter of fact" business like book on cottages and country residences was a desideratum. A work that should contain a series of original designs, adapted to every grade of living, from the humblest cottage to the noblest mansion, all accurately delineated to a scale, so that every one might examine for himself and judge of their practicability. He also deemed it requisite that these designs should be complete, comprising both elevations and plans, together with all such details as are usually made out in the form of working drawings, so that the builder might have all parts, both ornamental and constructive, immediately before his eye. In connexion with these, there should be such specifications and bills of quantities as are usually prepared by an architect, and in addition, articles on the various parts of the building that should furnish valuable information to the experienced man and to the learner.

The work thus conceived was determined upon. It was afterwards thought desirable to elevate its character, by adopting such features as would render it interesting and valuable to the general reader and projector, as well as to the artizan. Accordingly, so far as practice would admit, the designs were embellished in various degrees, and the best artists were secured for the engraving. Great care and pains have been expended to make it handsome, interesting and creditable, without detracting in the least from its practical value. Whether this high mark has been reached, the public must judge. It was also thought desirable to issue the work in monthly numbers, containing two complete designs each, thus placing it within the

reach of every one. A heavy investment, therefore, was not required at the outset; and the publishers were thus induced to expend more in proportion on each part, than would otherwise have been practicable. This plan too gave the author more time to digest and prepare each design.

The designs thus produced are strictly original. No work had been consulted for hints, but all are such as have either been prepared expressly for the purpose of inserting them here, or have occurred in the regular course of business. It has been a constant endeavour to avoid borrowed features, and if there be any designs which bear a resemblance to others already published or erected, the author is not aware of it; but at the same time he is conscious that it would be almost impossible to exhibit a series of designs, no one of which should be at all similar to any of the thousands which are annually prepared, all having a common object.

For the letter-press the same degree of originality is not claimed. On the contrary, facts have been collected from every available and reliable source. The subjects are such as have been thoroughly studied and written upon long ago, and it would be the height of folly to reject the aid thus proffered. The collation and wording of these facts, however, are entirely our own, and they are accompanied by a large amount of matter never heretofore published; so that there is probably much more originality in these essays than is usually found in works of the kind. They consist principally of a series of articles on the successive operations in the process of building, from the foundation to the finishing, each being described and commented upon. Beside these, there are accounts of the various styles, historical, descriptive, and critical, and other articles on various subjects interesting to all concerned. Each design is also accompanied by full descriptions, and wherever necessary, by specifications; though towards the end these, and the bills of quantities, are discontinued to avoid the constant repetition resulting from their similarity.

It is hoped that the work will not be unacceptable to the public. Every effort has been made to add to its intrinsic value, to give it variety, and to improve its general appearance. Thus far it has been favored with extensive patronage, and until the completion of the next volume no effort will be relaxed to deserve its continuance.

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INTRODUCTION.

THROUGHOUT the circle of the Fine Arts, none is less indebted to nature than Architecture. Poetry, rhetoricians tell us, is an imitative art; sculpture but copies natural forms of beauty; and the painter's canvass is Nature's mirror. But there is nothing to furnish architectural designs. Trifling decorations may be suggested by a leaf or scroll, but the resemblance that a Doric column bears to the human form, or the Gothic style to a bower of trees, is a fanciful afterthought, and not the bright preconception which gave them birth. The art stands alone, independent and original. Even the abodes of brute creation have offered no aid, and the caverns of the earth mock, by their rugged grandeur, our daring aspirations. The architect has drawn entirely from within himself, and given material embodiment to an abstract conception of fitness.

Although so entirely artificial in its origin, architecture nevertheless is completely under the control of nature. Mechanical laws enforce obedience in every structure. The inherent principles of good taste circumscribe design. If the architect violates certain proportions, disregards style, or rejects ornament, then his design, however well executed in other respects, loses all charm and offends every refined judgment. Plans suited to purpose, an appearance in unison with the locality, an adaptation of parts to the whole, and an appropriate use of ornament, are all essential to comply with the requisitions of cultivated taste. Thus, in every enlightened nation, we find a massive castle erected for defence or confinement, a cottage or villa for a country residence, a palace for a king, and a grand temple or gorgeous Gothic pile for the worship of a God. What artist paints the marble city mansion, surrounded by a pretty rural scene, or a villa towering upon a mountain cliff, surrounded by jagged rocks? Yet such singular combinations often occur in real life, producing harsh discord.

The erection of these incongruities, however, marks an important step towards refinement. They are the first attempts of a nation to rise above mere utility, and as information is disseminated, and a taste for the Fine Arts cultivated, these will gradually disappear, while beautiful, appropriate and correct designs take precedence. In this, as well as other respects, no people perhaps is advancing so rapidly as our own. A few years ago, when the country was new and the population sparse, we were satisfied with whatever supplied the bare necessities of life, but in the older states resources have rapidly increased, and with them the means of conducing to comfort, and of gratifying that innate love of the beautiful, which has been developed so rapidly, and is diffusing itself among every class. In consequence, everywhere throughout our land, which nature has decorated in such profusion, may be seen springing up ornamental

cottages, villas for retired merchants, and summer residences for citizens, all having some pretensions to style and ornament. A few are indeed beautiful, and at once characterize the projector as a man of taste and cultivation, but it is a great pity that many, perhaps the majority, are vain attempts at elegance, and are not only destitute of grace in themselves, but are deformities on the fair face of nature.

Still it is a pleasing fact, that the effort is being made to throw the charm of beauty around such buildings, for by it we are assured that at no very distant day, Art will join Nature in decking our land with beautiful creations. The people are anxious to learn, and as the sources of information increase, so will the principles of good taste be diffused. More elegant buildings will be erected, the mere contemplation of which will conduce to advancement, for every time a man feels the exquisite thrilling sense of beauty, his soul becomes more susceptible of its impressions, more sensible of its presence, and more capable of distinguishing the false from the true. Thus does the national character become infused with refinement.

The public are already aware of the fact, that by a due exercise of taste and judgment a dwelling may be erected, which will combine comfort and modern convenience with elegance and finished ornament, adding at the same time little or nothing to the cost. It is true also, that thousands of dollars may be expended in decorations, and the result be mere gaudy ostentation, utterly devoid of pleasing effect. The wealthy man may build more extensively, and with more luxurious splendour than one in moderate circumstances, but he cannot build more tastefully. Even a simple labourer, at no additional expense, may give a highly picturesque effect to his humble home. The painter more frequently copies landscapes surrounding a lowly but beautiful cottage, than those around the lordly mansion.

A man's dwelling, at the present day, is not only an index of his wealth, but also of his character. The moment he begins to build, his adopted style of living, the refinement of his tastes, and the peculiarities of his judgment, are all laid bare for public inspection and criticism. And the public makes free use of this prerogative. In such a case it expects an effort to be made, and forms opinions upon the result. We are beginning to see intellect admired more than wealth or power, and he who builds a beautiful residence now, is as much respected as were the old Barons with their vast domains and troops of retainers.

But no one can measure how much the charms of home are heightened by adding all the delights of tasteful elegance to the associations which throng its sacred precincts. Around this spot all the thoughts and affections circle. Here is rest. If peace be not here, it will not be found on earth. Then whatever beautifies and adorns home, adds directly to comfort and happiness, nor is there any thing so antagonistic to vice as its alluring delights. Indeed, all that is pure in human nature, all the tender affections and gentle endearments of childhood, all the soothing comforts of old age, all that makes memory a blessing, the present delightful, and gives to hope its spur, cluster around that holy place—home.

ARCHITECTURAL STYLE.

HUMAN habitations were first erected in compliance with the demands of necessity. When Architecture arose from this position into all the dignity of a Fine Art, it was essential, while supplying these demands, that it should contribute largely to ease and comfort, and also gratify our instinctive love of the beautiful. This love of beauty is not, however, the cause of the various styles in architecture. Beauty is universally the same, and the love of it is innate. It was created first, and man then blessed with the perception of it. The same command which gave birth to light gave birth to beauty, and it is as much beyond our control as the rise and set of sun. It is true there are various tastes arising from different degrees of perception of beauty, but primarily their principles are the same. The grade of refinement, or mode of education may determine the purity of taste, or an edict of fashion may for a time distort its features, yet like a twisted branch it will regain its natural position. In consequence of this oneness of the fundamental principles of taste, we find in every part of the globe that refined nations have always built in a style consonant with the object and locality, and have given an expression of uniformity amid variety, of fitness of means to an end, of utility in ornament, and of symmetry in proportions. We must look beyond this for the cause of the characteristic national styles of architecture.

The cause exists in our natural and artificial necessities. These vary with the climate, with national customs and character, and with the advancement of the mechanic arts. Thus in northern latitudes we find the high pointed roof, adapted to throw off the snow which falls in such immense quantities. In warmer regions, no such cause existing, the flat roof is more prevalent. Porches and verandahs are not used in the north to the same extent that they are south. In an unsettled country, agitated by civil war or infested by banditti, a massive style is adopted, so that every man's house may be a fortress. The social character of the people, the amount and kind of building material, the number and skill of artizans, all produce effect. These are the impulses which give direction to architectural style.

All styles may be divided into two classes, that derived from the post and lintel, and that derived from the arch. These are sometimes called the horizontal and perpendicular styles, the Grecian being a perfect type of the first, and the Gothic of the second. Frequently both are introduced in the same building, but generally with bad effect. Judging from the remains of the Greeks, they are supposed not to have been acquainted with the arch as an element of building. The Romans were probably the first who employed it, which they did profusely, intermingling it with the Grecian orders; but in the latter part of the dark ages, on account of its ready adaptation, the arched style was used almost exclusively.

We know very little of the domestic architecture of the ancients, but in all their heavy public edifices they have shown themselves to be far more skillful and tasteful architects than the moderns. Their stupendous structures defy the rough touch of time, and even to this day preserve their exquisite beauty. From the Middle Ages we have the elaborate, solemn Gothic, and the massive Norman. From more remote time, the Roman, with its ornate and luxurious magnificence, the Grecian with its chaste and severe simplicity, and the Egyptian with its ponderous and sepulchral grandeur. There are masses of masonry older even than these, but without the high finish essential to a style.

In domestic architecture, however, the moderns have never been surpassed for comfort and convenience. Throughout England and America, all kinds of style in their different adaptations are used, and indeed at the present day there are few countries in which a peculiar national style is exclusively adopted. More generally, those existing are remodelled and mixed in a variety of ways to suit different purposes. Every pure style, however, has features peculiar to itself, and is thus rendered distinct from all others. The proportions, ornaments, or any of the characteristics which thus isolate it, if connected with another, produce a discordant and disagreeable effect. Hence men of just taste reject this hybrid style, and their residences are generally designed and ornamented correctly. In the course of this work, specimens of the various styles will be given, and their history, distinguishing features, and whatever else of interest may be connected with them, will be discussed.

AN ITALIAN VILLA.

DESIGN FIRST.

This Villa is designed after those which have been prevalent in Italy since the fifteenth century. The style has been introduced into other parts of Europe, into England and America, and so well adapted is it to the wants and tastes of our people, that it is likely to become, if it is not already, one of our most fashionable styles for country residences. It possesses very little of the rural character, and seems much more appropriate for the retired home of one accustomed to city life, than for one born and bred in the country. Its location, consequently, should not be in the depths of the forest, but within a few miles of the city. The grounds around, arranged in smooth lawns, groves, gravelled walks, and finished gardens, accord well with the general expression of the style. A fountain in front, and a few vases or statues scattered here and there add to the pleasing effect.

The Perspective View, Plate I., exhibits the general appearance of the building very happily. The gables on either side of the campanile give symmetry to the front, and at the same time, take away that monotony and rigid uniformity, which is likely to result from the nearly rectangular ground plan, and which above all things is to be avoided in country houses. The campanile appears like a centre, around which the other parts of the building are grouped. The porch over the main

entrance, the stained glass windows, and the balconies, make it the most ornamental feature, while the verandah on the right, and the conservatory on the left, give the whole an expression of ease and elegance. The windows opening into the verandah may be made to reach the floor, and thus render it accessible from the parlor as well as the library.

Plate II. is a front elevation of the same, giving the proportions correctly, and exhibiting the constructive features of the building more distinctly. Very many of the more prominent details may be taken directly from this plate, without any reference to others.

Plate III. exhibits the plans of the first and second stories. The great conveniences of this compact and delightful arrangement of apartments are here made evident. We see that the building will readily accommodate a family of eight or ten members, servants inclusive. As the kitchen is immediately beneath the room marked Sitting R., it might be more convenient to use this as a dining room, and to use the room opposite the parlor as a sitting room.

Plate IV. consists of details. Fig. 1 exhibits a column of the front porch, with a section through the architrave, frieze and cornice.—Fig. 2, the base of the first and second stories.—Fig. 3, inside doors.—Fig. 4, cornice and cantaliver of the tower.—Fig. 5, section of an inside door, with the dressings.

Plate V. is also detail drawings.—Fig. 1 shows a section of the platform of the tower balcony with bracket.—Fig. 2, front of the same.—Fig. 3, cornice, with cantaliver and section of wall.—Fig. 4, verandah post with capital.—Fig. 5, balusters.—Figs. 6 and 9, section through a window head and sill.—Fig. 7, section of the verandah cornice.—Fig. 8, conservatory post showing the sash.—Fig. 10, window frames with dressings.

All other information necessary to construction may be gathered without difficulty from the following complete

SPECIFICATION

Of the workmanship and materials required in the erection of Design First.

DIMENSIONS.—The entire extent of the front is sixty-two feet, that of the side is forty-one feet together with eleven feet for the projection and verandah in the rear. The first story containing a vestibule, a hall, a double flight of stairs, a dining room, sitting room, parlour, library, store room, private stairs, closets, &c., is to be thirteen feet four inches high to the top of the second floor. The second story, containing five chambers, a bath room, eight wardrobe closets, and stairs leading to the tower, is to be ten feet in the clear. The room in the tower is to be nine feet high in the clear. The roof is to pitch six feet. For the divisions and other general dimensions, reference is to be had to the plans on Plate III.

EXCAVATIONS.—The cellar is to extend the entire length and breadth of the building, and to be six feet deep below the line of the yard pavement. The portion under the sitting room, private stairs and entry, is to be arranged for a kitchen. There is to be likewise, in the rear, an area of the same depth, by five feet wide at the bottom, with a bank sloping upwards and outwards at an angle of sixty degrees. The trenches for foundations in the cellar are to be eight inches deep, and those under the verandahs and conservatory are to be two feet and a half deep. The earth is to be graded around the building from the under-side of the water-table to a distance of five feet from the wall. All superfluous earth is to be removed from the grounds, or to such parts thereof as may be directed.

STONE WORK—All the outside walls of the cellar, and the foundations of the appendages are to be composed of quarry building stone of a good quality. These walls are to be eighteen inches thick, and built as high as the under side of the joists, and all based upon a course of long flat stone, well and solidly laid in mortar. The mortar is to be composed of coarse, sharp sand, and wood-burnt lime, in such proportions as to insure the strongest cement. All the facings are to be smooth dashed and lime washed.

BRICK WORK.—The superstructure upon the stone wall is to be composed of bricks. It is to be of double thickness, with a hollow space in the centre one and a half inches wide. No soft bricks are to be used in the outer course. The division walls in the cellar are to be of hard brick, and of double thickness, with doorways, &c. All flues are to be formed for gas, warm air and ventilation, as shown on the plans, and as may be directed during the progress of erection. They are to be pargetted and topped out with smooth brick, as shown upon the elevation. The walls on either side of the hall

are to be of brick, one story high, and of double thickness. There is to be a case of brick in the cellar under the hall, large enough to receive a furnace sufficient to warm the whole house. The area, the provision cellar and pantry, are to be paved with good paving bricks, laid in mortar. The area is to have a guard wall fourteen inches high to support the bank, also a gutter to convey water to a cess pool at the end for drainage.

JOISTS, &c.—The joists of the first story are to be of spruce or white oak, three by twelve inches; those of the second story are to be hemlock of good quality, three by eleven inches; all to be placed sixteen inches between centres, to be backed, and have one course of herring bone bridging through the centre. The ceiling joists are to be three by five inches, and placed sixteen inches between centres. The joists in the tower are to be three by nine inches, and the same distance apart. The rafters are to be three by five inches, and placed two feet between centres. They are to be sheathed with one inch quartered and grooved boards. The studding throughout the partitions is to be three by four inches, those for the doors three by six inches, and all placed sixteen inches between centres. The sleepers in the basement are to be of white oak, three by four inches, and placed twenty inches between centres.

FLOORS.—The floors throughout the interior of the building are to be laid with one inch Carolina heart pine, well worked, well seasoned, firmly nailed to the joists with eightpenny nails, and afterwards smoothed off. The front vestibule is to be floored with white pine plank, not over four inches wide or one inch and a half thick, grooved together, with white lead in all the joints.

WINDOWS.—All the windows are to correspond to the elevation and detail drawings. The sash are to be one inch and a half thick, and double hung with the best one and three-quarter inch axle pulleys and patent cord. The sash in the tower and conservatory are to be diamond. The side windows of the parlor, dining room, and second story hall front are to extend to the floor. The windows of the wings and the rear are to have close shutters on the first story one inch and a half thick, each shutter to have three panels with suitable mouldings. The corresponding windows in the second story are to have one and a half inch pivot blinds. The shutters to each window are to be in two parts, and all are to be hung with good strap hinges, and secured by ten inch bolts in the first story, and eight inch bolts in the second story. The front windows are to have inside shutters of three folds, with four panels each, and mouldings. They are to be hung in two parts each, and secured in the usual way.

DOORS.—The front doors are to be folding, two inches and a half thick, with four panels in each, and finished by mouldings and fillets. They are to be hung with three four by four inch butts, and secured by an eight inch mortice lock, with a night key, and by two iron plate flush bolts. All the room doors on the first story are to be two inches thick, and contain eight panels each, with mouldings and fillets. They are to be hung with two four by four inch butts, and fastened with four inch mortice locks. All outer doors are to be two inches thick, having a bead butt on the inside, and moulding with fillets on the outside. The room doors in second story and basement are to be one inch and a half thick, with mouldings on both sides, and hung with three and a half inch butts, and secured by three inch mortice locks. All outer doors are to be one inch and a quarter thick, hung with two and a half by three inch butts, and secured by locks wherever necessary.

DRESSINGS.—The parlor, dining room and hall, are to be finished with seven inch pilasters, and a moulding band two inches and a half square. The front windows must have panelled backs. The wash-board is to be seven inches wide, with a two inch and a half sub, and a two inch moulding. The second story is to have five inch pilasters, with a two and a half inch square band. The wash-board is to be six inches wide, with a two and a half inch sub, and a two inch moulding. The cornice is to be constructed according to the drawings.

CLOSETS.—All the closets and wardrobes throughout the building are to be fitted up and fully shelved. Three in the second story are to have each a set of drawers. The store room also is to be fitted up with all necessary shelves.

STAIRS.—The main stairs are to be made of the best heart step boards, one inch and a quarter thick, and put up in the best manner. The newels are to be mahogany, eight inches square, with turned cap and base, and with an octagon shaft. The rail is to be four inches square moulded, also mahogany. The balusters are to be one inch and three quarters in diameter, and turned of maple or other hard wood. The private stairs leading from the basement to the upper room in the tower, are to be made of one inch heart step boards, put together as is usual for such stairs.

VERANDAHS.—The verandahs each are to be constructed in accordance with the drawings. The floors are to be of white pine one inch thick, grooved together with white lead in the joints. The ceiling is to be lined with well seasoned, grooved, quartered and beaded boards, smoothed for painting. The roof of the one on the side is to be curved, of that on the rear to be flat. The roof of the conservatory is also to be curved. The posts, caps, &c., are to be executed as in the detail drawings. The entrance porch is to be constructed according to the drawings, and in the best manner. The sash of the conservatory in the south wing are to be one inch and a half thick, and so constructed as to be readily moved.

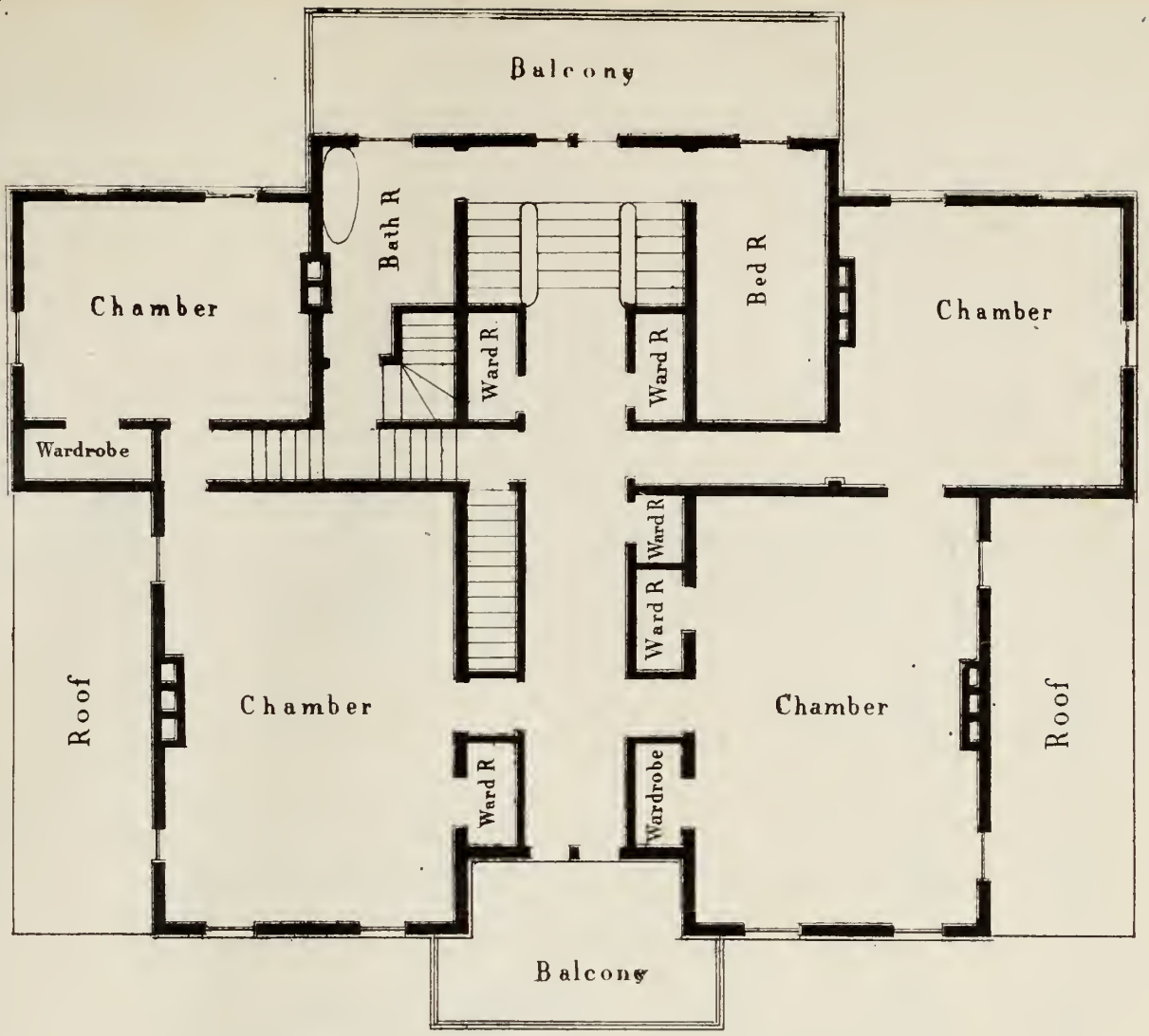
TINNING.—All the roofs are to be overlaid with the best quality one cross loaded tin, painted on both sides; the upper side to have two coats. All necessary gutters, and four three inch conductors to convey the water from the roof, are to be put up and secured to a wall string in the best manner.

PERSPECTIVE VIEW.

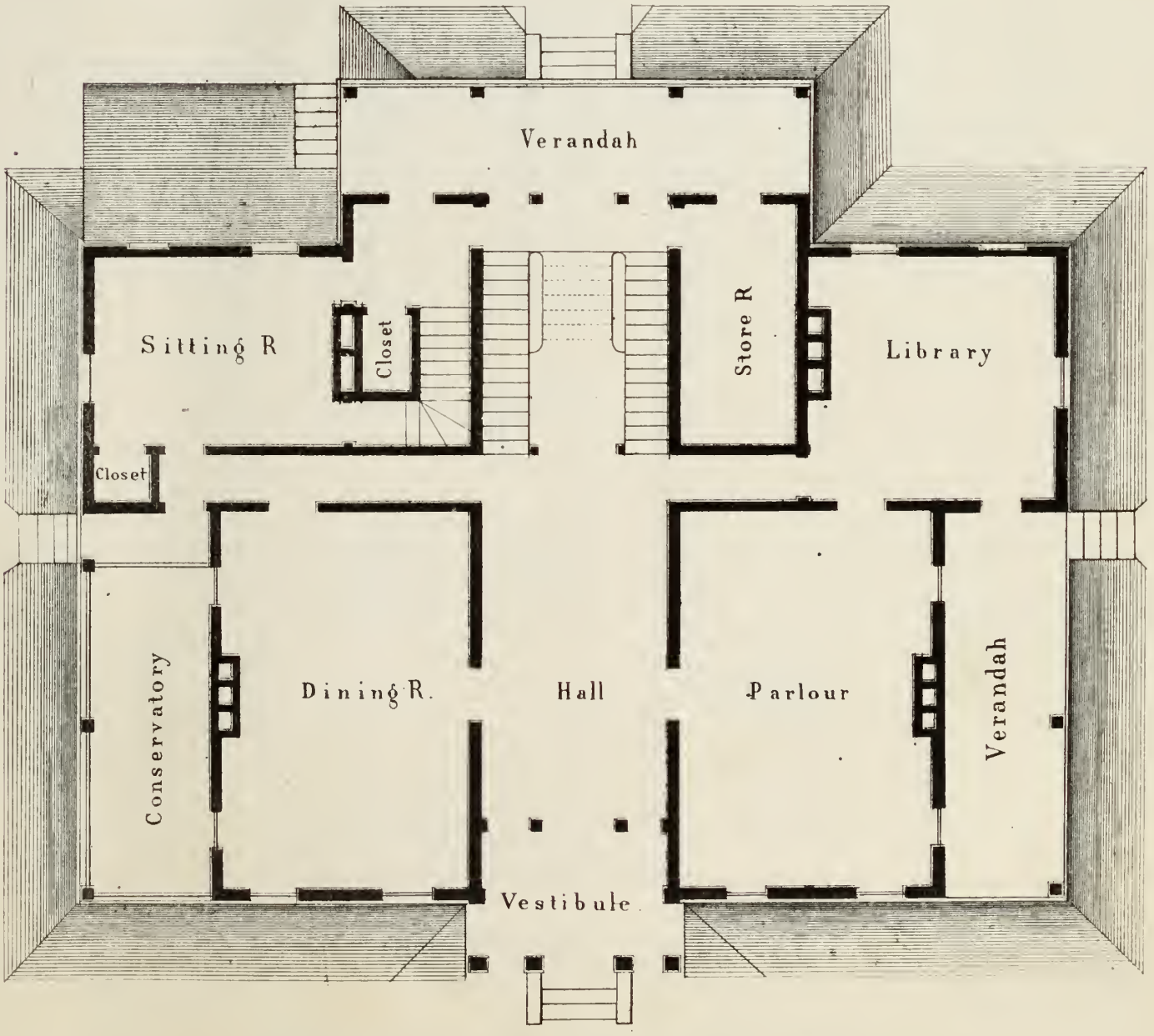
Sam[l] Sloan, Arch[t]

P.S. Duval's Steam [illegible]

ITALIAN VILLA.



SECOND STORY.

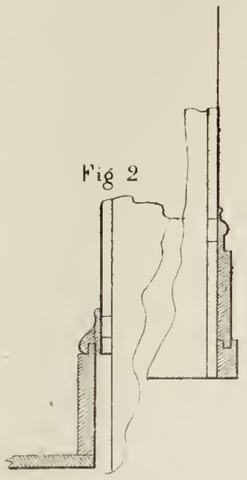


PRINCIPAL STORY.

Scale 10 feet to an inch.

GROUND PLANS

Fig 2



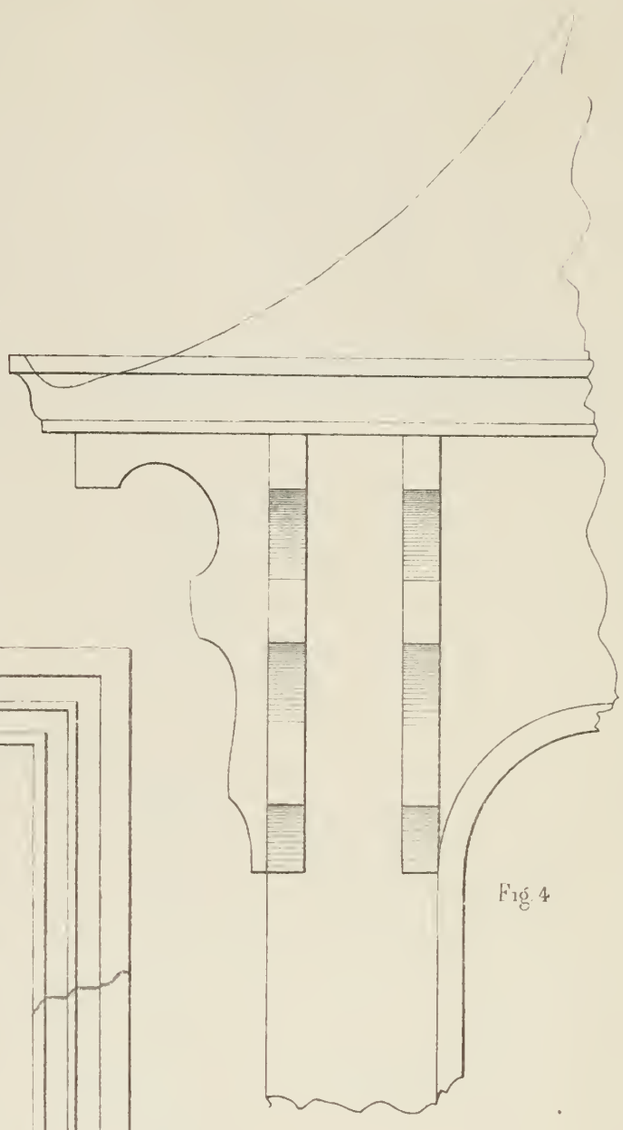


Fig 4

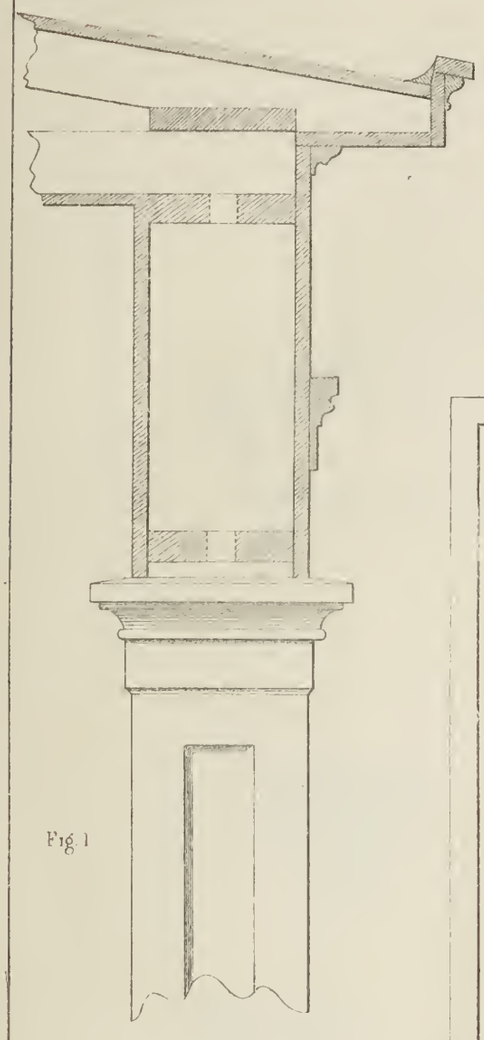
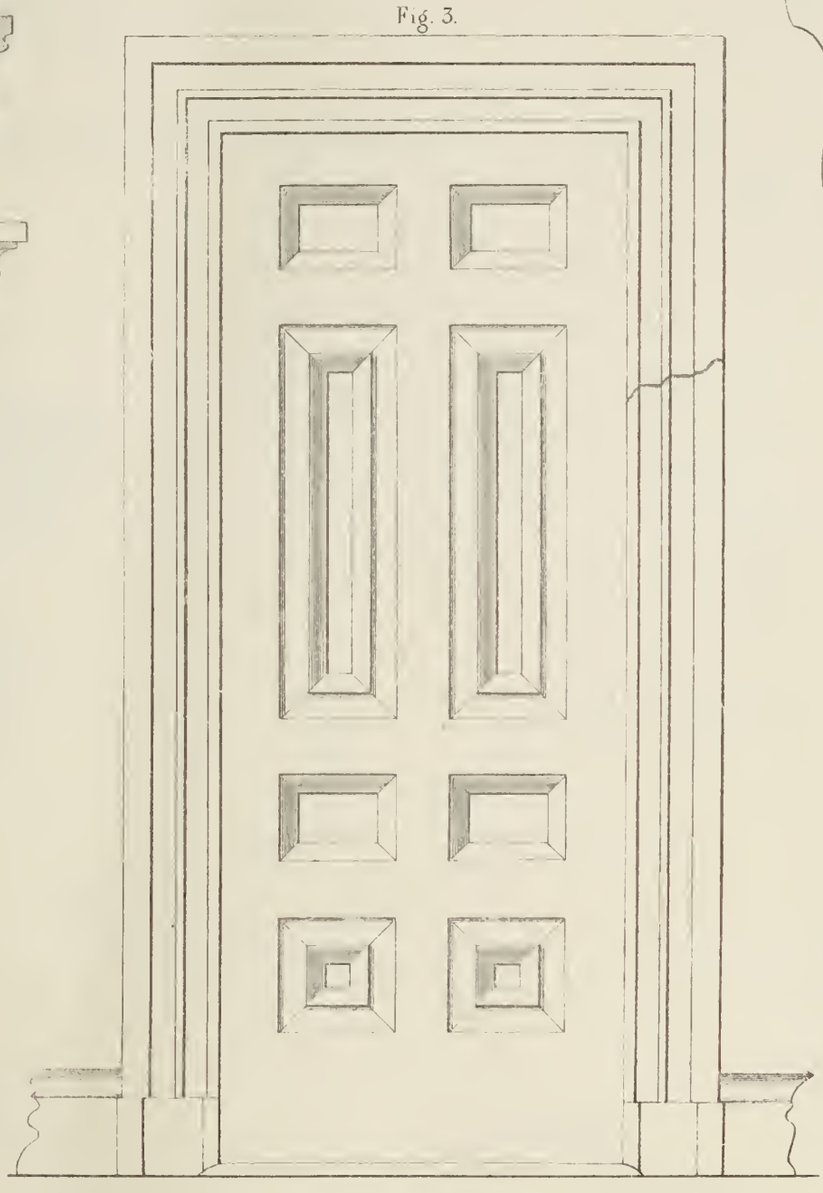


Fig 1

Fig. 3.



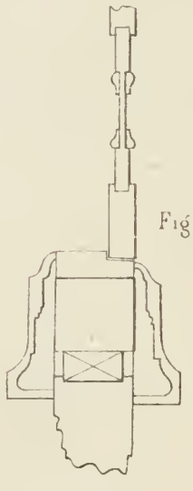
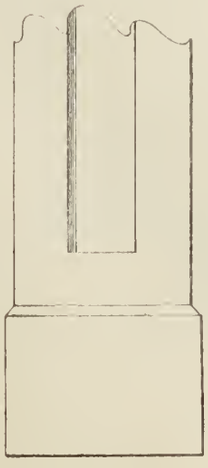


Fig 5



Scale to door only

¾ inch to a foot.

Scale One foot to the inch.

DETAILS.

P. S. Duval's Steam Ith Press Philad.ª

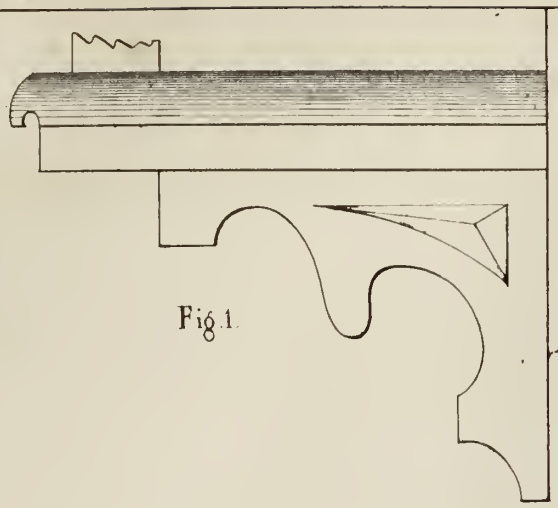


Fig. 1.

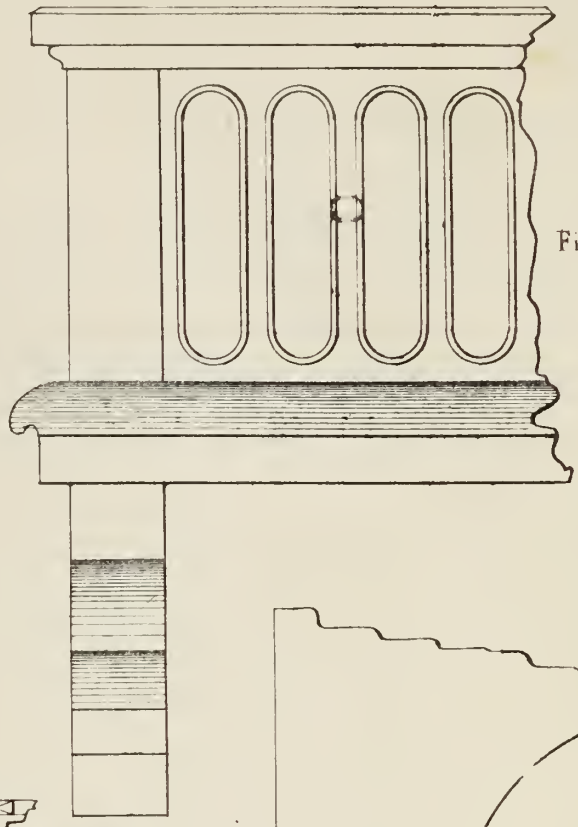


Fig. 2.

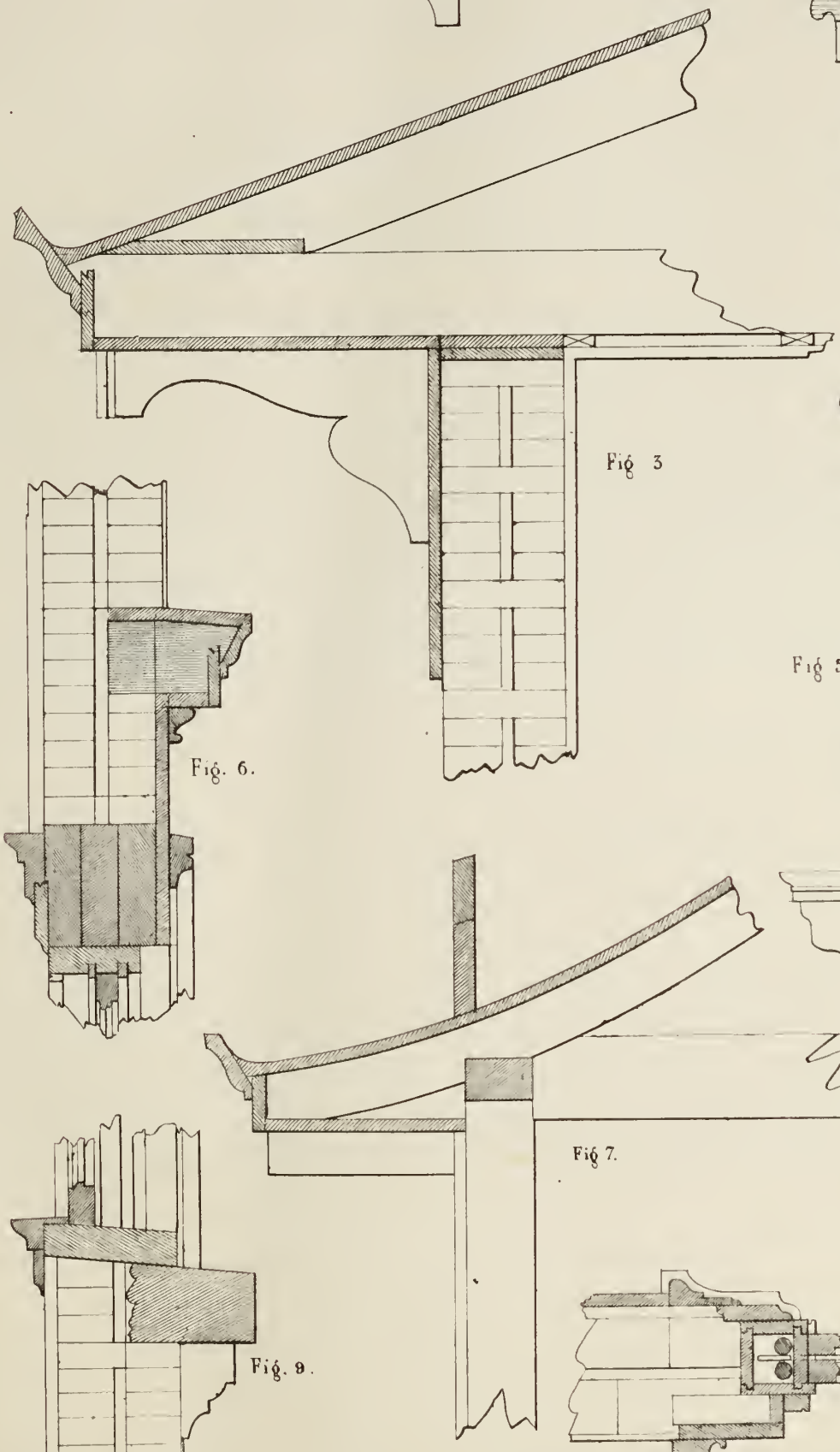


Fig 3

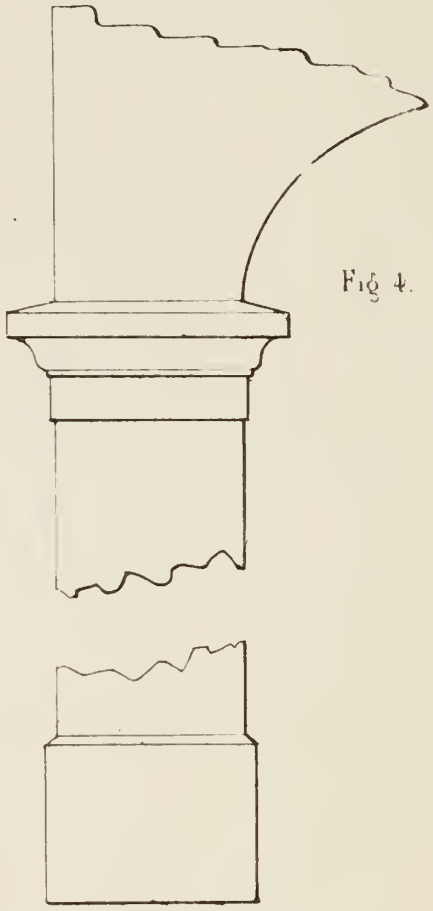


Fig 4.

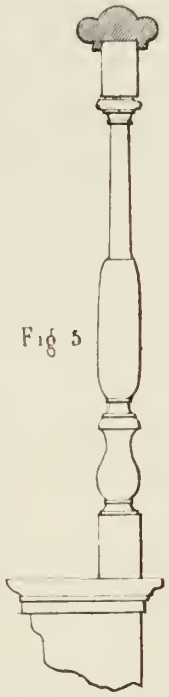


Fig 5

Fig. 6.

Fig 7.

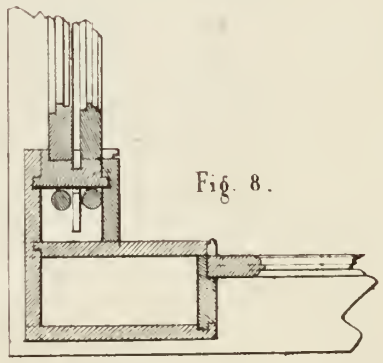


Fig. 8.

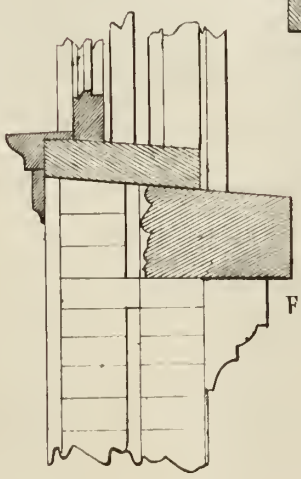


Fig. 9.

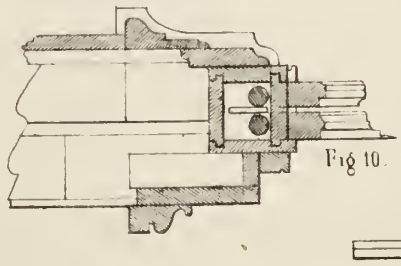
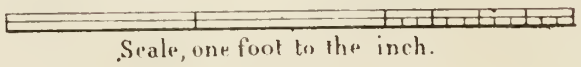


Fig 10.



Scale, one foot to the inch.

DETAILS.

P.S Duval's steam lith. Phil.a

ROUGH-CASTING.—All the outside walls are to be rough-east in the very best manner, by a workman familiar with the business. The materials are to be of the best kind, and the whole laid off in blocks.

PLASTERING.—All the walls and ceilings inside are to be plastered with two coats of brown mortar, and one of white hard finish. The parlor, dining room and hall, are to have a cornice in the angle to girt eighteen inches. Each room and hall is to have a sunken panel on the ceiling three inches deep, with an enriched moulding, also a centre flower three feet six inches in diameter, and one in the hall three feet in diameter. The front rooms and hall of the second story are to have a cornice girting fourteen inches, and all other walls to be plain. The mortar must be composed of clean river sand, and wood burnt lime in proportions to insure strength. The hair mixed with it must be sound, and the lath free from bark.

PAINTING AND GLAZING.—All wood work, inside and out, is to have three coats of the best white-lead paint, and of such tints as the owner may direct. The outside steps are to receive four coats of paint, and be well sanded. All glass is to be of the best quality of American manufacture, well bradded, bedded and back puttied.

HARDWARE.—All hardware necessary to make the building complete in every part must be of the best quality of American manufacture. All the door knobs, except those of the kitchen, are to be of porcelain. There are to be seven bells, including that of the front door, placed in such rooms as the owner may wish. All the metal furniture of the front door is to be silver plated.

PLUMBING.—A reservoir of five hundred gallons capacity, strongly made with two inch plank, and lined with lead weighing three pounds to the foot, is to be placed in the loft over the bath room. The bath tub is also to be made of boards, panelled in front, and lined with lead weighing five pounds to the foot. A force pump is to be placed in the kitchen, with tubes leading to the reservoir, the boiler back of the range, and sink in the kitchen. The bath tub and sink are also to be furnished with a hot water pipe extra strong, and all necessary draw and stop cocks are to be placed upon the different pipes, so that the whole work may be finished in the best manner.

COOKING RANGE.—The kitchen is to be furnished with a medium size range of the best and most improved construction, with a twenty-five gallon boiler attached, and so arranged as to heat the room above and bath room.

FURNACE.—There is to be a furnace in the cellar to warm the whole of the first story except the sitting room, and the second story. The flues to convey the heat to the different rooms are to be tin cased, and furnished with approved registers richly bronzed.

FINALLY.—All the work is to be done in the best workmanlike manner, according to the elevation, plan and detail drawings exhibited on plates II., III., IV. and V., and according to the general intent and meaning of this specification, subject at all times to the decision of an architect.

GENERAL ESTIMATE

OF THE COST IN ERECTING DESIGN FIRST.

The cost of the building will of course vary with the location, with the kind and abundance of material, &c. We suppose it to be situated near a city, where the price of labor, material and transportation is not greater than in this section of the United States. In other parts of the country, a calculation is easily made by comparing costs.

Built of brick, and finished in other respects according to the specification, the total sum will not be *more* than $5,000. If stone be substituted, the sum will be but $4,800. If the size of the building be reduced, so as to accommodate a family of but six or eight persons, servants included, it will diminish the cost to about $4,000. These are estimates in round numbers, but they are calculated from a bill of items, which it was deemed unnecessary to give, and if there is any error, it lies in an excess.

GOTHIC ARCHITECTURE.

UCH difference of opinion has existed respecting the origin of the Gothic style in Architecture. Many of the best writers on the subject believe that it was brought from the East. There have been found, both in India and Persia, structures of undoubted antiquity, which comprise as a prominent feature the pure Gothic arch. They suppose it to have been brought from thence by the Arabians, and by them carried into Spain; that here the Goths adopted it, who, being acquainted with Roman architecture, and mixing its details to some extent with the other, produced the style which has received their name.

Others have believed that the style originated among the Ostrogoths, and was by them introduced into Italy under Theodoric, A. D. 484, where it received its finish. Some have imagined the pyramid to be its source; others, more poetical, have supposed that the general effect of the style was planned by some bright genius in imitation of a grove, and hence the minor ornaments are taken from foliage. The fret work, the groined arches, the pillars in the nave, and the tracery of the windows, do bear a distant, but beautiful resemblance to the arcades and interlacing boughs of a grove.

The true origin of the style, however, is to be found in the corruption of the Grecian orders by the Romans, which was continued through the Dark Ages, until all trace of the original disappeared.

The Lombards, who succeeded the Goths in Italy, were thoroughly acquainted with Roman architecture. They were expelled by Charlemagne, and dispersed throughout Europe. In consequence of their different habits, the different material, and an inferior degree of skill in their artizans, they soon made their style of building distinct from the Roman. The arch was found more convenient, and was adopted to the exclusion of the Grecian column. They built more coarsely and more massively.

The Normans, on their conversion to Christianity, adopted this style, and so improved was it by the zeal of their monks in ecclesiastical architecture, that it became their own. They built with greater finish, enlarged the arches, introduced more of them, added decorative mouldings, and produced magnificent structures, that yet stand to rival modern skill. Their vast conquests soon established these improvements throughout Europe, and after their settlement in England more attention was given to the art.

Further changes were now made. Ornaments were used in greater profusion. The arches were multiplied and stilted. They were brought in close proximity, and finally made to intersect each other, thus producing the pointed arch. This was then exclusively adopted. Perpendicular lines increased in

number. The walls were built less massively, and buttresses with pinnacles appeared. More decorations were superadded, and other changes made, until in the latter part of the twelfth century the Gothic style stands confessed and distinct, presenting a most striking contrast to the styles of the ancients.

The Gothic style has never been subjected to rules so strict as its predecessors. There has always been great freedom allowed, not only in ornaments but in proportions, and consequently, from the time it was first recognized until its abandonment, it was undergoing constant, though very gradual changes; yet such strongly marked features have characterized its different stages of development, that it may readily be subdivided, and its progress thus explained.

The EARLY ENGLISH style prevailed from the latter part of the twelfth until the latter part of the thirteenth century. It has been called the *Lancet Pointed* style from the peculiar form of the windows. These were pointed, long, narrow and without tracery. Towards the first of this period they were placed singly, but afterwards in groups, occasionally combined under one large arch, and the tympanum thus formed was sometimes pierced with a trefoil. The doors were massive with deep jambs, and the Norman zig-zag was replaced by the tooth moulding. The flying buttress was introduced, and the conical roof of the tower was elongated, thus forming a tapering spire. There are not a great many original specimens of this style extant. Salisbury Cathedral is perhaps the most perfect, and some parts of Westminster Abbey built thus, are in a good state of preservation.

By an easy transition, we now pass into the DECORATED style, which flourished between the latter part of the thirteenth and the latter part of the fourteenth centuries. It existed under the reign of Edward I., but chiefly prevailed under those of Edward II. and Edward III., and is considered the perfection of medieval architecture. It was characterized by purity in ornament, with greater freedom and richness in design. The principal feature is the window: it is considerably enlarged, and the arch made obtuse, or with the apex and points of impost at equal distances, forming the equilateral arch. The space included in this triangle, or tympanum as it is called, is filled with tracery, sometimes geometrical, but generally flowing in most graceful curves, the mullions branching out with great delicacy and lightness. A peculiar ornament called the ball-flower was used very extensively. The foliage of the capitals was crumpled and carved more naturally. The buttresses were niched, and more elegant general proportions were adopted. There appears to have prevailed during this period a school of art, both in architecture and sculpture, which in beauty of design and finish of execution surpassed any other since the fall of the Western Empire. The two arts declined together.

The third division is called the PERPENDICULAR or *Florid* style. It flourished from the latter part of the fourteenth century until the Reformation, a period of about one hundred and fifty years. The principal characteristic of this style is also to be found in the window. The arch was much depressed; the mullions, instead of branching into tracery, were continued perpendicularly upwards, and crossed by transoms. Indeed throughout there was a tendency toward vertical lines. There was also a great increase of decora-

tion. Every part of the structure, both inside and out, was loaded with rich carving, cut with great depth, minuteness and delicacy, but so abundant as to give to the whole a meretricious effect, and hence cause the style to be generally considered a decadency. Highly ornamented paneling, fan tracery for the ceiling, a horizontal hood mould embracing two or more narrow windows, and a high peaked roof elaborately finished, were all introduced at this time. The latter feature is beautifully exemplified in Westminster Hall; and the Chapel of Henry VII., also at Westminster, is a magnificent relic of this age.

About the middle of the sixteenth century the Reformation began, and entirely changed the current of affairs. Architecture, among other things, was gradually revolutionized. It had been until now under the protection of the Roman Catholic Church, the zeal of whose dependents was the cause of the present advanced stage of the art. With that liberality which was practised towards every thing that would advance their creed, they expended upon these buildings nearly all the monastic revenues, private offerings, and voluntary donations which poured into their coffers. The dignitaries of the church were the architects, and the laity were the workmen: hence the great care and pains expended upon the most minute portions of these venerable fabrics. Domestic architecture of course followed the different styles, but it was in ecclesiastic structures that the whole art was concentrated, and its perfection displayed; nor was there, at the time of which we speak, any land that could vie with England in the number and magnificence of these edifices. But the time had come when the idolatry of superstition was to give way before a spirit of innovation, which, not satisfied with the suppression of monasteries, seemed to retain even against the buildings a prejudice that not only prompted their mutilation or destruction, but opposed itself to a continuance of the style. The revival of classical architecture in Italy about this time, also had a considerable effect in producing what has been called the DEBASED style. The arch was more depressed until almost flat, ornaments were rejected, even to plainness, which, together with an admixture of Italian details, entirely changed the character of the buildings.

At this time arose Inigo Jones, the architect of White Hall and Surgeon's Hall; also Christopher Wren, Knight, another learned man and accomplished architect, who designed St. Paul's and other famous works. These two were impassioned with the styles then coming into vogue in Italy, and labored hard to reproduce them in England, to the exclusion of that style to which Wren contemptuously gave the name "Gothic." The great fire of 1666 gave the latter ample opportunity for exercising his influence, and this period may be considered as terminating Gothic architecture in England.

On the continent, the Gothic style underwent nearly the same changes that it experienced in England. The Perpendicular style, however, differed in detail somewhat from the Late Gothic in Germany, and the Flamboyant in France, to which it corresponded in point of time. When the style became extict in England, it was almost simultaneously abandoned throughout Europe, and the Italian has since been the prevailing mode.

A GOTHIC COTTAGE.

DESIGN SECOND.

On Plate VI. is represented a perspective view of a Gothic Cottage. It is in the Elizabethan style, and possesses that marked rural character which exhibits itself so decidedly in all such cottages. The English wish to claim this style as peculiar to themselves, but they have no right to appropriate a principle which has existed throughout Europe, and which is of universal application. We have in this a house as un-English as possible, the internal arrangements being thoroughly American, while externally it is a truthful exemplar of the style.

The front elevation is exhibited on Plate VII. The design combines economy with its tasteful appearance; for if built of brick, and the specification below followed in other respects, it will cost but $2,800, and if stone be substituted, this will be reduced to $2,650. These estimates are carefully calculated, and are certainly not too small. Plate VIII. exhibits the ground plans.

Plate IX. consists of details. Fig. 1, a verandah post with a section through the cornice. Fig. 2, crocket course to the preceding. Fig. 3, a post and cornice of the entrance porch. Fig. 4, inside door. Fig. 5, a chimney-can.

Plate X. also consists of details. Fig. 1, shows a window with outside dressings. Fig. 2, section of inside dressings. Fig. 3, cornice. Fig. 4, base. Fig. 5, section of a window frame. Fig. 6, finial. Fig. 7, section through a conservatory post and sash.

Further remarks are unnecessary, all other important points being explained by the following

SPECIFICATION

Of the workmanship and materials to be used in the erection of Design Second.

GENERAL DIMENSIONS.—The main building is to be twenty by thirty-five feet. Entrance hall is to be fourteen by fifteen feet. The conservatory is to be eleven by twelve feet. The rear building is to be seventeen by twenty-five feet. The whole is to be two stories high; the first story twelve feet to the top of the second floor, the second story ten feet in the clear, and the roof is to have fifteen feet pitch.

ROOMS.—The first floor is to contain a drawing room, library, dining room, hall and kitchen. The second story is to contain five chambers, the entry and bath room. There are also to be two rooms in the loft of the main building.

EXCAVATION.—There is to be, beneath the entire extent of the building, an excavation five feet below the yard pavement. The earth therefrom is to be graded around the building to the under side of the water-table, and the surplus earth to be removed to such parts of the grounds as may be directed.

STONE WORK.—All cellar walls are to be composed of quarry building stone of a good quality, and to be eighteen inches thick to the under side of the flooring joists. The foundations of the porch, verandah and conservatory, are to be at least two feet deep. All the above masonry is to be laid in the best mortar, made from good coarse sharp sand and wood burnt lime. All the facings of the walls are to be smooth-dashed and white-washed.

BRICK WORK.—All outside walls, and the division walls between the two buildings, are to be of coarse hard brick, and to be ten inches thick, with a hollow space in the centre. All flues are to be well pargetted, and topped out above the roof at its apex, finished with an ornamental chimney-can, as on the elevation. Also a brick furnace chamber is to be built in the cellar, of a capacity sufficient for the reception of Chilson's No. 4 furnace.

JOISTS, &c.—The floor joists of the first story throughout, and of the second story in the main building, are to be three by twelve inches. Those over the dining room, kitchen, and the second story main building, are to be three by ten inches. The ceiling joists are to be three by five inches. All are to be well backed, latticc bridged, and placed sixteen inches between centres. The rafters are to be three by eight inch rafter cuts, placed two feet between centres. The ridge piece is to be three by twelve inches, and the wall plate three by ten inches. All the above timber must be

good sound seasoned hemlock. All stud partitions are to be formed of three by four inch scantling firmly nailed, and placed sixteen inches between centres; door studs are to be three by six inches.

STAIRS.—The main stairs in the hall are to be formed of one inch and a quarter heart step boards, put together on strong carriages. The newels are to be black walnut, seven inches square at the base, with an octagon shaft, the rail of the same material and moulded, the balusters of the same, one inch and three quarters square at the base, with a turned shaft. The private stairs are to be continued from the cellar to the main loft, and put up as is usual for such stairs.

WINDOWS.—All sash are to be one inch and a half thick, hung to casement frames with suitable butts, and secured by plate flush bolts at top and bottom. The glass are all to be diamond shape, except those of the kitchen.

DOORS.—The main entrance door is to be two inches thick, having five panels sunk with mouldings, and hung with four by four inch butts, and secured by an upright mortice lock with night key. The room doors of the first and second stories are to be one inch and a half thick, with mouldings on both sides, hung with three by three inch butts, and secured by a four inch mortice lock. All other doors are to be one inch and a quarter thick, hung with three by three inch butts, and secured by locks where necessary.

DRESSINGS.—The window and door dressings are to be put on as exhibited in the detail drawings, except the kitchen and loft, which will be plain. The wash-board of the first story main building is to be eight inches wide, with a two and a half inch sub, and moulding as referred to in the description of plates. The dining room and second story main building are to have the same without the sub, all others but six inches wide. The cornice and ornaments are to be as shown on the detail drawings. The verandah, porch and conservatory are to be constructed as shown on the elevation, plan and detail drawings. All roofs are to be sheathed with seasoned boards for slating. All lumber is to be of the best quality, and the carpenter's work is to be executed in a good and workmanlike manner.

ROOFING.—The roof is to be overlaid with the best Susquehanna slate, seven by fourteen inches, laid diamond shape, and secured by four-penny galvanized nails. All necessary tin for the valleys, ridge and hips is to be of a good quality, and painted slate colour.

PLASTERING.—All walls and ceilings are to have two coats of brown mortar, and one of white. The parlor, hall and library are to have a cornice in the angle of the ceiling to girt twelve inches. A centre flower in the parlor is to be three feet diameter, and one in the hall two feet six inches, such as the owner may approve.

PAINTING AND GLAZING.—All interior wood work is to receive three coats of pure white lead paint, mixed with the best linseed oil. The exterior is to receive four coats of paint, and sanded in the best manner. The glass of the first story main building and dining room is to be of the best quality American manufacture, the rest to be second quality. All must be well bradded, bedded and back puttied.

HARDWARE.—All hardware necessary to make the building complete in every part, is to be of a good and approved quality. The knobs in the main building are to be of white porcelain. All others are to be mineral.

FINALLY.—All the work is to be executed in a good and workmanlike manner, after the detail and other drawings, and according to the general intent and meaning of this specification.

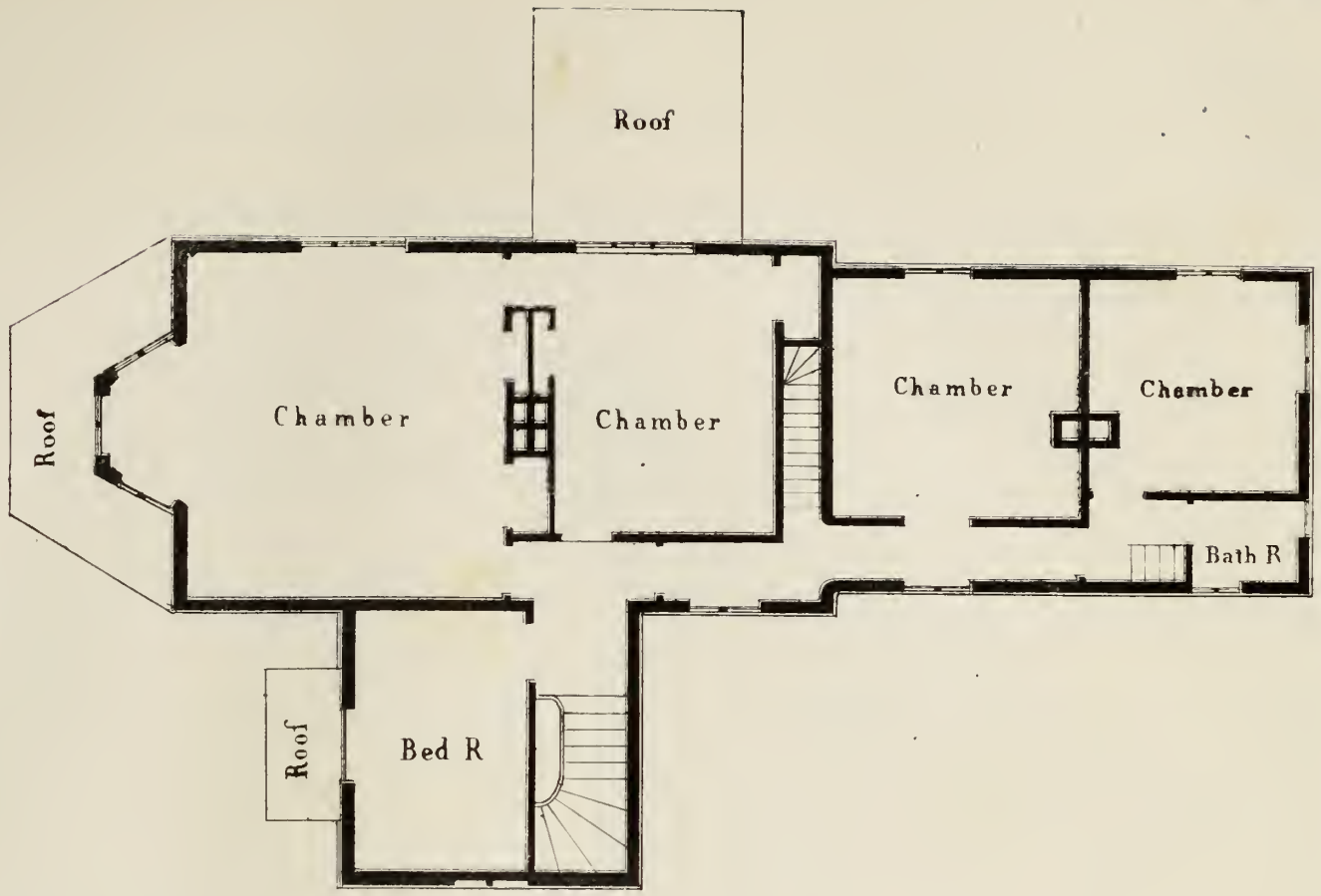
PERSPECTIVE VIEW.

Saml Sloan Archt

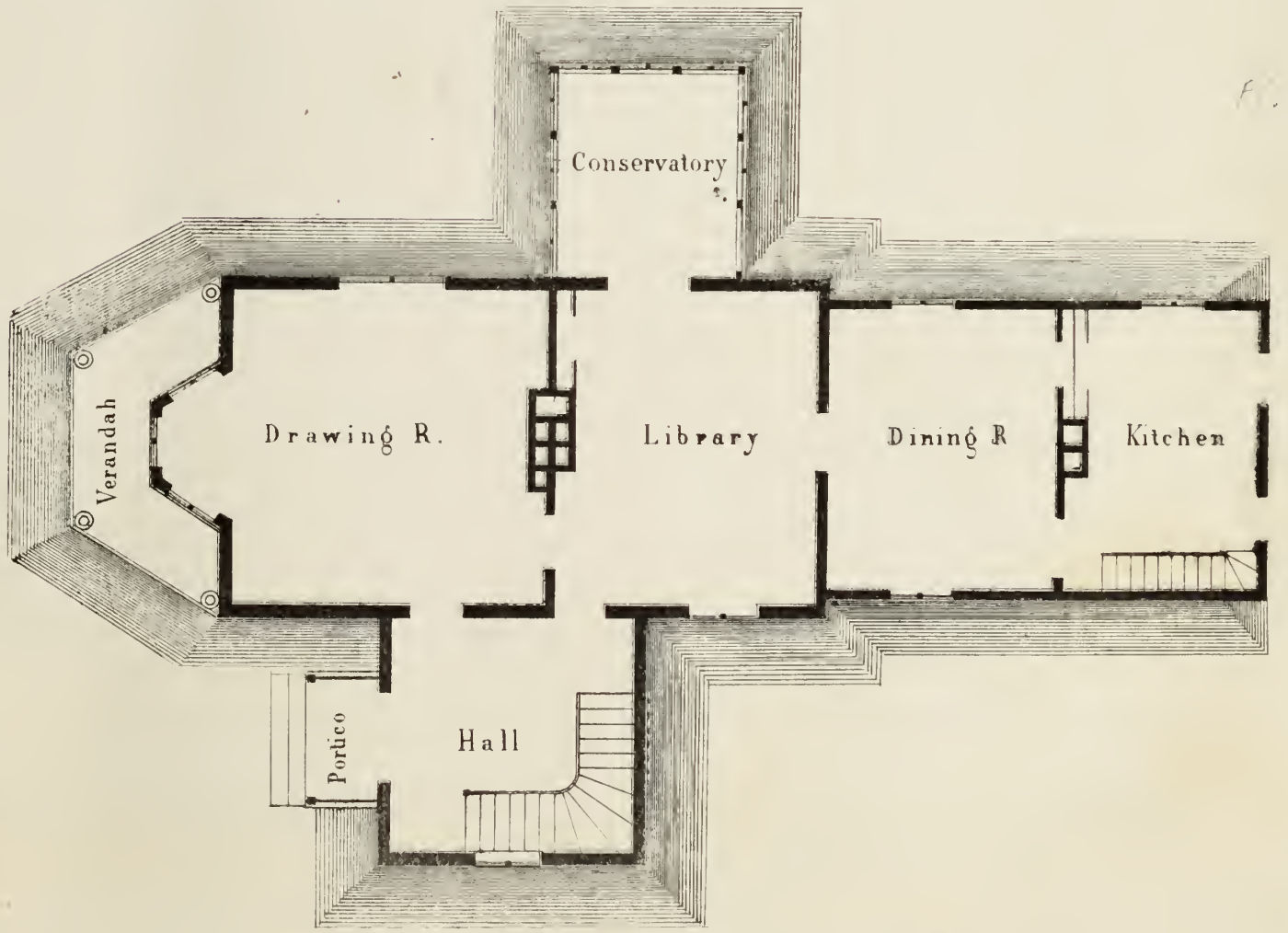
P.S.Duval's Steam lith Press Philada

ENGLISH GOTHIC STYLE.

Scale ten feet to the inch



SECOND STORY.



FIRST STORY.

Scale, 10 feet to an inch

GROUND PLANS.

Fig. 1

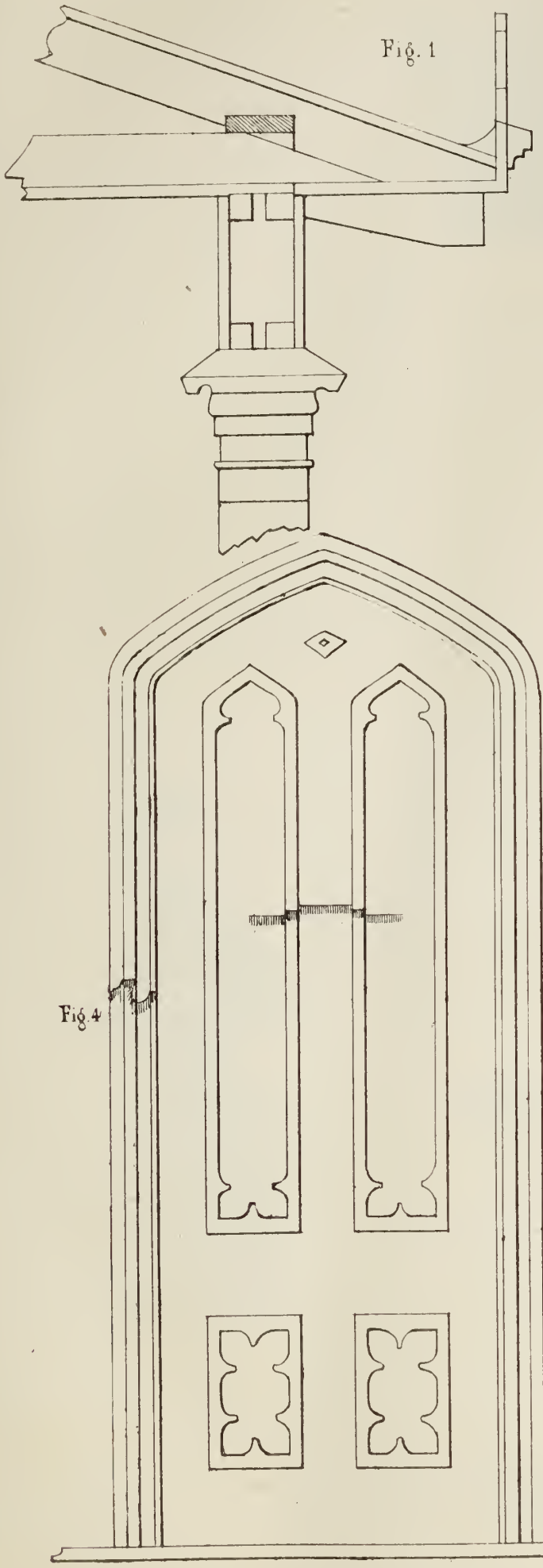


Fig. 4

Scale to door only. 3/4 inch to a foot

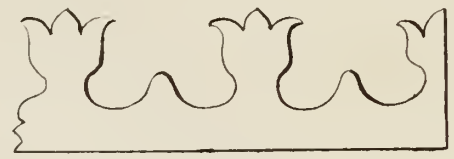


Fig. 2.

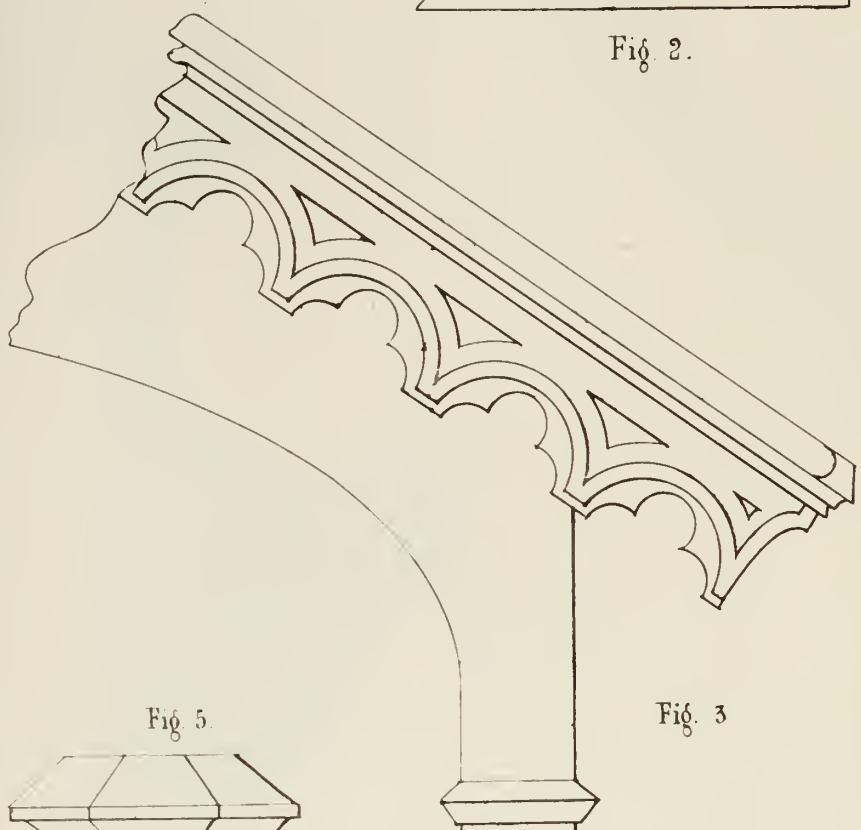
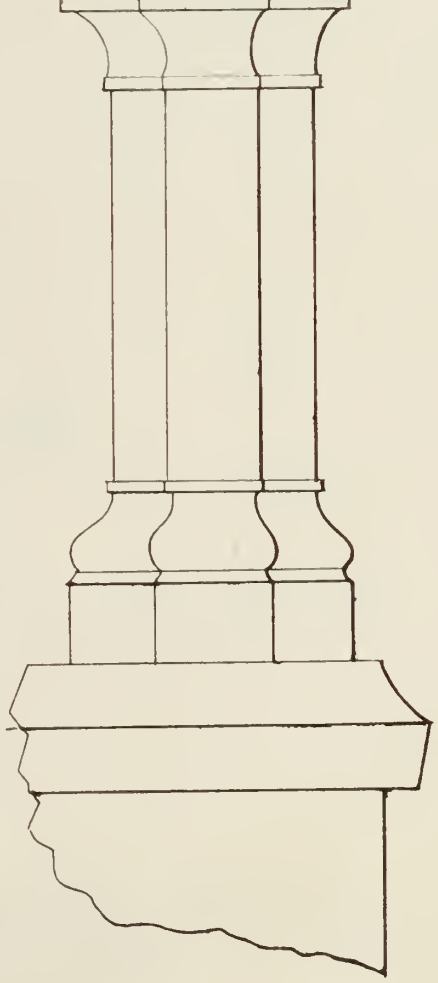


Fig. 3

Fig. 5

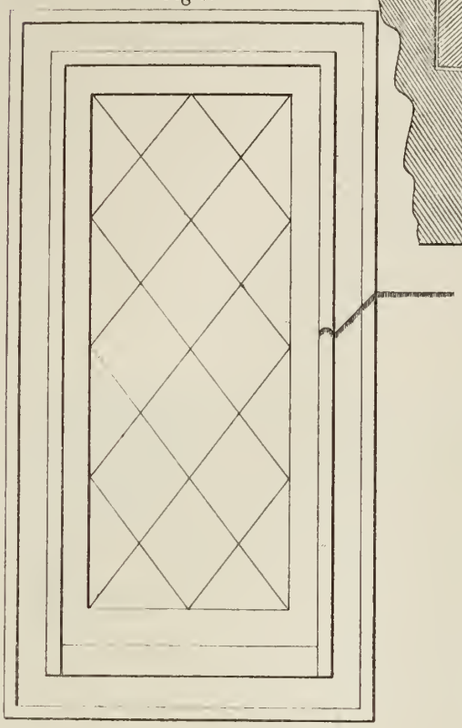


Scale, one foot to the inch.

DETAILS.

P. S. Duval's steam lith. press Phil.ª

Fig. 1.



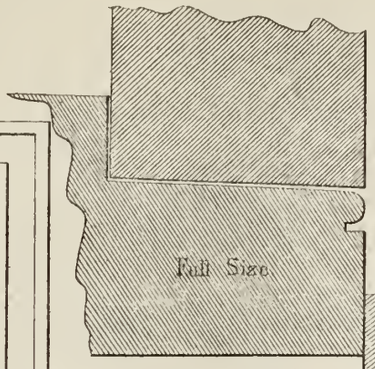


Fig. 2.

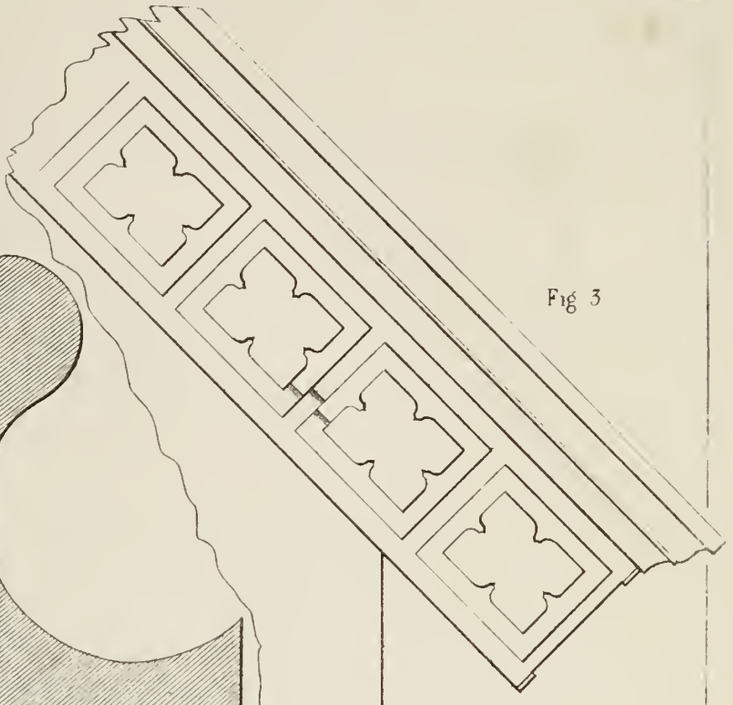


Fig. 3

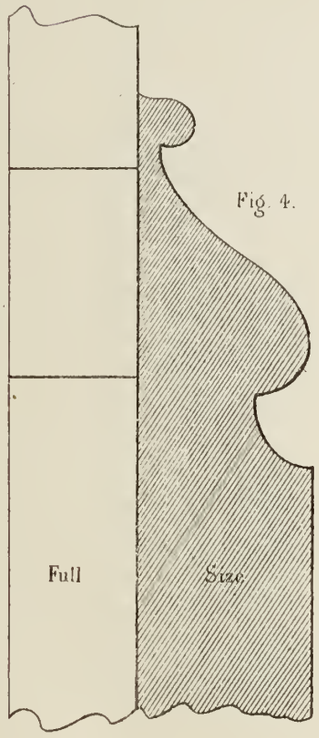
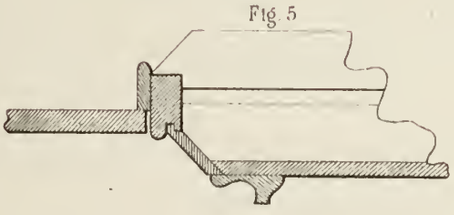


Fig. 4.

Fig. 5



Scale 1 foot to the inch

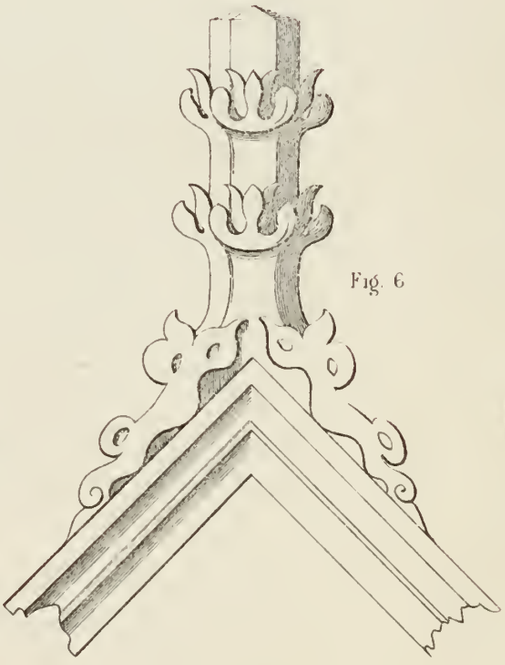


Fig. 6

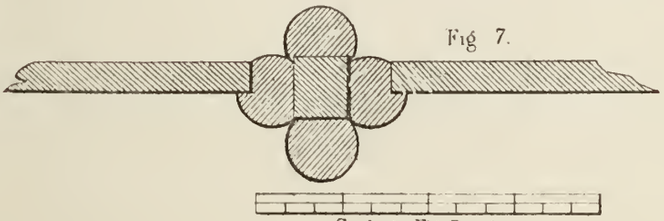


Fig. 7.

Scale to Fig 7 only
½ inch to the foot

DETAILS.

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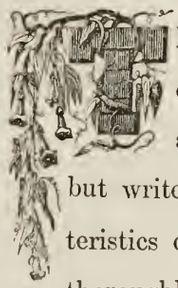
DEBASED GOTHIC.



THIS style has already been referred to as that which prevailed in England during the century immediately succeeding the commencement of the Reformation. The terms Tudor and Elizabethan, have each been used in reference to different stages of its development, but writers on the subject have always disagreed, both in dates and as to the respective characteristics of the two. In using the word Debased, we follow Bloxam, than whom no one is more thoroughly versed in all that appertains to Gothic architecture. The term must not be understood in a bad sense, as depreciating the style, but simply as referring to the fact, that during the time mentioned, i. e., from the last of the Perpendicular style until the total extinction of this species of architecture, there was a constant change being wrought in the principles of the general style, and a rejection of that abundance of exterior ornament which had previously prevailed.

At this time, more attention was given to domestic architecture than had been hitherto. Throughout Old England the nobles seemed to vie with each other in the erection of large and magnificent Manor houses. The splendid reign of Elizabeth most encouraged this, and the decorations from without were apparently transferred to the interior, which was indeed carefully and gorgeously ornamented. Speaking of these buildings, Captain Grose, in his Antiquities of England, says:—"They have a style peculiar to themselves, both in form and finishing; where, though much of the old Gothic is retained, and a great part of the new taste adopted, yet neither predominates; while both thus distinctly blended compose a fantastic species, hardly reducible to any class or name." In fact, this style is far better adapted to domestic purposes than any of those in the same class which preceded it. Pure Gothic architecture is admirably fitted for ecclesiastical purposes, but not for much else; yet when it was shorn to some extent of its long vertical lines, its high pointed windows, and of its elaborate and expensive details, then the irregularity of its outline, the flexibility of its principles, together with the addition of Italian features, gave it all that was desirable for a private mansion.

The Debased style is principally characterized by its comparative plainness. The Tudor arch, as it is called, is much used. It is described from four centres, and is more depressed than its predecessors; so much so, that in some instances it is cut in a single stone, and this placed over the opening like a lintel. Indeed, even this afterwards ceased to be practised, and although some of the circumadjacent details were retained, yet there was no appearance whatever of an arch. This finish was generally confined to windows, and the Roman arched doorway used. The windows, however, especially in the

earlier stages, were most frequently composed of three or more openings, with either trefoil or plain pointed heads, covered by a horizontal hood-mould. The octagonal bay-window, which was first introduced in the Perpendicular style, was now made semicircular. Buttresses entirely disappeared, embattlements were freely used, and also porches. The Italian campanile and verandah were frequent in private houses, and in heavier edifices Grecian columns were not uncommon. One after another, the different Gothic features were rejected, until all trace of them was lost.

It is not proper to regard the Debased as a style altogether pure; nevertheless, we must not therefore condemn it entirely, for there have been designs from it which, in grace, elegance and finished decoration, are unsurpassed.

A GOTHIC VILLA.

DESIGN THIRD.

This design, as well as the one preceding it, is in the Debased Gothic style. Design second is the earlier of the two, and exhibits many features strongly Gothic. The Tudor flower running along the apex of the high pointed roof, the finial over the gables, some of the windows, the door, and the porch are all decidedly so, and indeed throughout it is much more an "Elizabethan" building than design third. In the latter, the square-headed windows and the tower, which is Italian although finished with a battlemented parapet, show at once that it prevailed subsequent to the other. It has nevertheless retained the Tudor flower, the finial, the steep roof, and the Gothic doorway, forming a most elegant and picturesque building. There is little rural character about the design. It would never do for a farm house, but is evidently fitted for the retiring citizen. This fact at once suggests its locale, and the style in which the grounds should be ornamented.

The side and front elevations are given on Plates XII. and XIII., exhibiting the constructive features of the building in accurate proportion. It is doubtless oftentimes the case that a person, wishing to build, may be much pleased, on the whole, with one of our designs, and would adopt it were it not for some minor feature either in the plan or style of the house unsuited to his peculiar tastes and wants. Alterations, such as he would wish, may frequently be made without injuring the general appearance or the plan; but great care must be exercised in so doing, for they may create an inconsistency in the style, which would afterwards be regretted, or they may, from some little oversight, so affect the plan as to render it impracticable. The best way in such a case, undoubtedly, is to consult the architect, and then no difficulty can obtain. We will, however, from time to time, mention some such changes as may be made consistently. In this design little can be done; yet, perhaps, a porch might be used over the front entrance and the conservatory omitted. The Tudor arch, mentioned above, may be seen over the front door.

Plate XIV. shows the plans of the first and second stories. By these we see that the building will readily accommodate a family of eight or ten persons, servants included, at the same time giving ample space for hall, parlor, spare chamber,

library, &c., &c. We cannot omit the opportunity of calling attention to the elegant library herein designed. Any one accustomed to the wants and frequent inconveniences of private libraries will be struck at a glance with the peculiar fitness of this apartment for that purpose.

Plate XVI. Comprises the details. Fig. 1, a section of the tower wall. Fig. 2, a spandrel for the front door. Fig. 3, face of the tower. Fig. 4, principal cornice and section. Fig. 5, design for a conservatory window. Fig. 6, Tudor flower to be placed on the ridge piece. Fig. 7, finial. Fig. 8, buttress for the entrance door. Fig. 9, hood-mould for the windows. Fig. 10, cornice and blocking of the conservatory.

SPECIFICATION

Of the workmanship and materials required in the erection of Design Third.

DIMENSIONS.—The building is to be forty feet nine inches in front, measuring through the tower, by fifty-seven feet six inches flank. It is to be two stories high, the divisions and heights of the stories being made according to the elevations and plans. There are to be three garret rooms, and a room in the tower upon the same level. The tower is to be four stories high.

EXCAVATION.—The cellar is to be throughout the entire extent of the building eight feet deep below the top of the first or principal floor. The foundations of the walls are all to be at least six feet deep below the cellar floor. The earth therefrom is to be graded around the building as the proprietor may direct when the building shall have been completed, and all surplus soil and refuse material is to be removed from the grounds.

MASONRY.—All the outside walls of the building are to be composed of quarry building stone of a good quality. The foundations are all to be laid with large flat stone, well and solidly bedded in mortar. The walls are to be two feet thick to the height of the principal floor, and from thence to the square of the building they are to be one foot four inches thick. The gable ends and facings of the dormer windows are to be one foot two inches thick. The walls of the tower are to be two feet thick from the foundations to the sill course of the third story windows, thence twenty inches thick to the sill course of the fourth story windows, and from thence sixteen inches thick to the square. The cellar doorway under one of the kitchen windows is to be walled on either side with fourteen inch walls to the line of the yard pavement. All the masonry is to be done with mortar composed of good coarse sharp sand and wood-burnt lime, in such proportions as will secure the best and strongest cement. The inner facings of the walls are to be well dashed with the same mortar, and those of the cellar to be afterwards whitewashed.

Of the dressed stone there is to be a sill platform, and one step to the front entrance; also, a sill to the kitchen door, the sizes of which are exhibited on the plans. A moulded water table, eight inches thick and of six inches projection, is to be built in the wall around the building. The above is to be Connecticut brown stone, of a good quality, dressed and set in the best manner.

BRICK WORK.—There is to be built in the cellar a case of nine inch walls and of sufficient capacity for the reception of a furnace suitable to warm the whole building, all flues are to be properly formed for the heated air and gas, and placed as exhibited upon the plans and as may be directed by the proprietor.

JOISTS, &c.—The joists of the first floor are to be three by twelve inch spruce, of a good quality. Those of the second story are to be three by twelve inch hemlock; the third tiers to be three by nine inch hemlock. All are to placed sixteen inches between centres, to be backed and to have one course of bridging through the centre. All trimmers for the flues and stairs must be double thickness. The collar beams are to be one and a half by eight inches, firmly nailed to the rafters, about eight feet above the joists. The rafters are to be eight inches at the foot, of the usual rafter cut, and placed two feet between centres. The cornices are to be as exhibited on the plate.

WINDOWS.—All windows throughout the building are to be in accordance with the plates. The sash of the first and second stories are to be one inch and three quarters thick and double hung. The sash of the lofts and of the third and fourth stories in the tower, are to be one inch and a half thick, and double hung with plastered jambs. The sills are all to be heart pine, and the sub-sills to be iron. The windows are all to have moulded heads. The inside shutters of the first and second stories are to be made in two folds with paneled backs and elbow jambs. They are also to be one inch thick, four panels high, moulded, hung and secured in the best manner.

DOORS.—The front doors are to be folding, one inch and three quarters thick, with moulded panels on the face, bead and butt on the inside, hung with four by four best butt hinges, and secured by two iron plate flush bolts, the one at the top being at least three feet long. It is to be further secured by one eight inch mortice upright lock, with a night key which will also open the vestibule door The vestibule door is also to be one inch and three quarters thick, double faced

with moulding, hung with four by four inch best butts and secured by a vestibule lock. The doors communicating between the parlor, sitting room, and dining room are to be folding, one inch and three quarters thick, and double faced with moulding. All other doors in the first and second stories are to be one inch and three quarters thick, hung with suitable butts, and double faced. The doors above the second story, and all closet doors, are to be hung with suitable butts and secured by such fastenings as the proprietor may approve.

STAIRS.—The main stairs, extending to the second story, are to be put up in the best manner. The steps are to be one inch and a quarter heart step boards, of the best quality, supported on three strong carriages. The rail is to be four inch moulded, the newel eight inch with a turned cap and base, and an octagon shaft, and the balusters one and three quarter inch turned; all of which is to be mahogany. The private stairs leading from the kitchen and from the second story to the loft, and the stairs in the tower, are to be enclosed and made of heart step boards, in the best manner. The cellar stairs are to be beneath the private stairs.

INSIDE DRESSINGS.—The washboards in the first story are to be twelve inches high including a two and a half inch sub nailed firmly to the floor, and a one and a half inch moulding on the top. The washboards in the second story are to have a similar finish, but only ten inches in height. Those of the closets, kitchen and loft are to be four and a half inches wide with a one and a half inch moulding on the top.

The window and door dressings, in the first story, are to be seven inches wide and in accordance with the plates. Those of the second story are to be five inches wide, and also according to the plates. Those of the loft and the third and fourth stories in the tower are all to be champhered on the angles of the jambs.

CLOSETS.—All the closets throughout the building must be fitted up and fully shelved, and a dresser in the kitchen is to be finished in such a manner as the proprietor may direct.

PARTITIONS.—All the divisions in the building are to be stud partitions. The studs being three by four inches, except those next the doors, which are to be three by six inches. All are to be placed sixteen inches between centres.

CONSERVATORY.—The conservatory is to be enclosed by diamond sash with Gothic heads, as figured on the plate, double hung by patent cord and axle pullies. The roof is to be flat.

PLASTERING.—All walls and ceilings within the building are to have two coats of brown mortar and one of white. The hall, parlor, sitting-room, and dining-room are to have a cornice in the angle of the ceiling to girt fourteen inches; also, a centre flower in the hall and parlor three feet six inches in diameter, of an approved pattern. The mortar is to be composed of river sand and wood-burnt lime in such proportions as are best. All laths are to be free from bark.

ROUGH-CASTING.—All exterior walls are to be coated with the best mortar, put on in a workmanlike manner, divided in imitation of blocks, and finished with approved tints.

SLATING.—The roof of the main building is to be overlaid with the best purple Welsh slate, laid in four courses of diamond and four courses of square pattern alternately, and fastened with fourpenny nails previously boiled in linseed oil.

PAINTING AND GLAZING.—All wood-work inside and out that it is usual to paint, must have three coats of pure white-lead paint, mixed with good linseed oil, and of such tints as may be directed.

The glass is to be of the best quality of American manufacture. It is to be well bedded, bradded, and back-puttied. That of the conservatory is to be stained in such patterns as may be selected, the cost not exceeding sixty dollars.

TIN WORK.—The conservatory roof and that of the tower and entrance porch, are all to be overlaid with the best one-cross roofing tin, painted on both sides, the upper having two coats. All valleys, ridges, flushings, and gutters are to be tin of the same quality, and all necessary gutters and conductors to convey the water from the roof, are to be put up in a proper manner.

HARDWARE.—All the hardware is to be of a good quality. The locks are all to be of American manufacture. There is to be a bell for the front door with a large sized plated pull, also five other bells in such parts of the house as may be directed. All other hardware necessary to make the building complete is to be furnished.

MANTELS.—There are to be mantels in the parlor, sitting-room, and dining-room, the cost of which shall not be less than ninety dollars. There are to be two in the principal chambers of the second story, the cost of which shall not be less than forty dollars.

RANGE AND FURNACE.—The kitchen is to be furnished with a medium-sized range of the most improved kind. The furnace is to be Chilson's No. 3, with all the necessary dampers, registers, and tin flues sufficient to warm all the first and second stories. The registers are to be of an approved pattern and enamcled.

FINALLY.—The contractor is to furnish, at his own cost, all material and workmanship necessary to erect, and complete this building, to the satisfaction of the proprietor, according to the elevations, plans, and details, and the general intent and meaning of this specification.

Sam[l] Sloan. Arch[t]

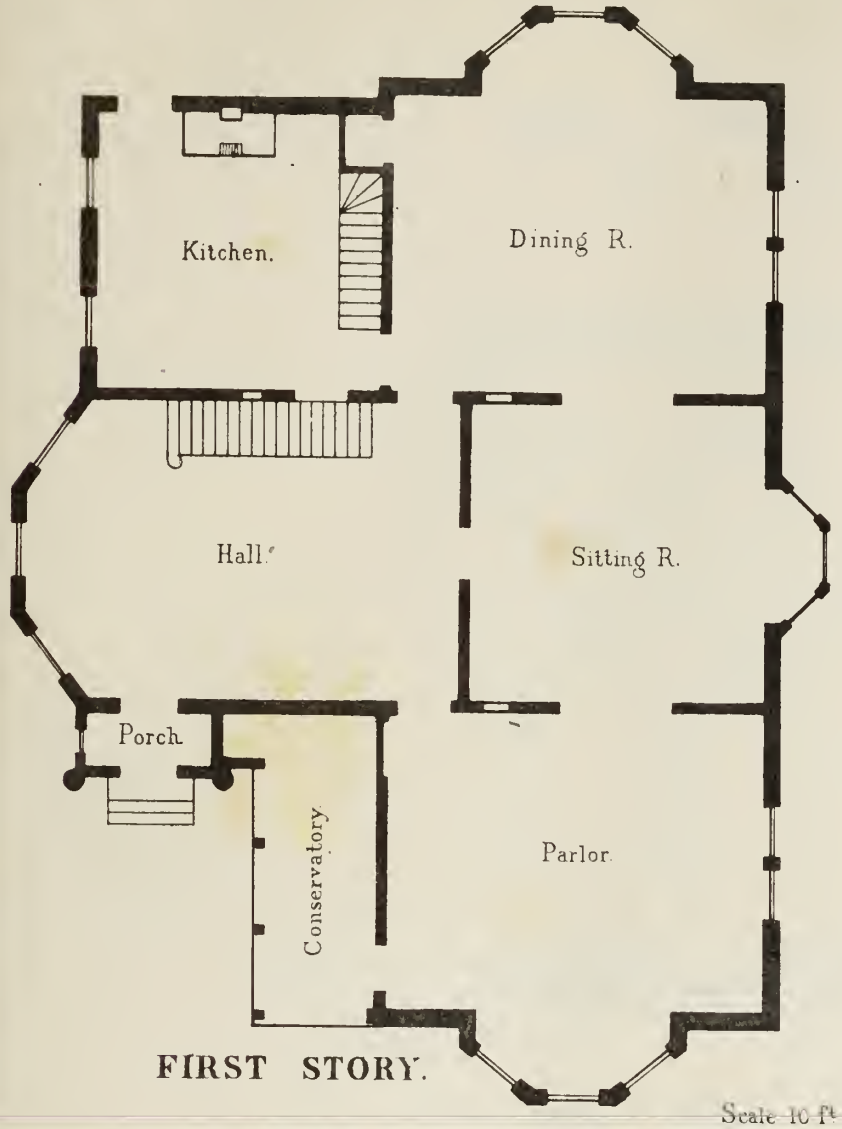
P.S. Duval's Steam Lith. Press Phila[a]

SIDE ELEVATION.

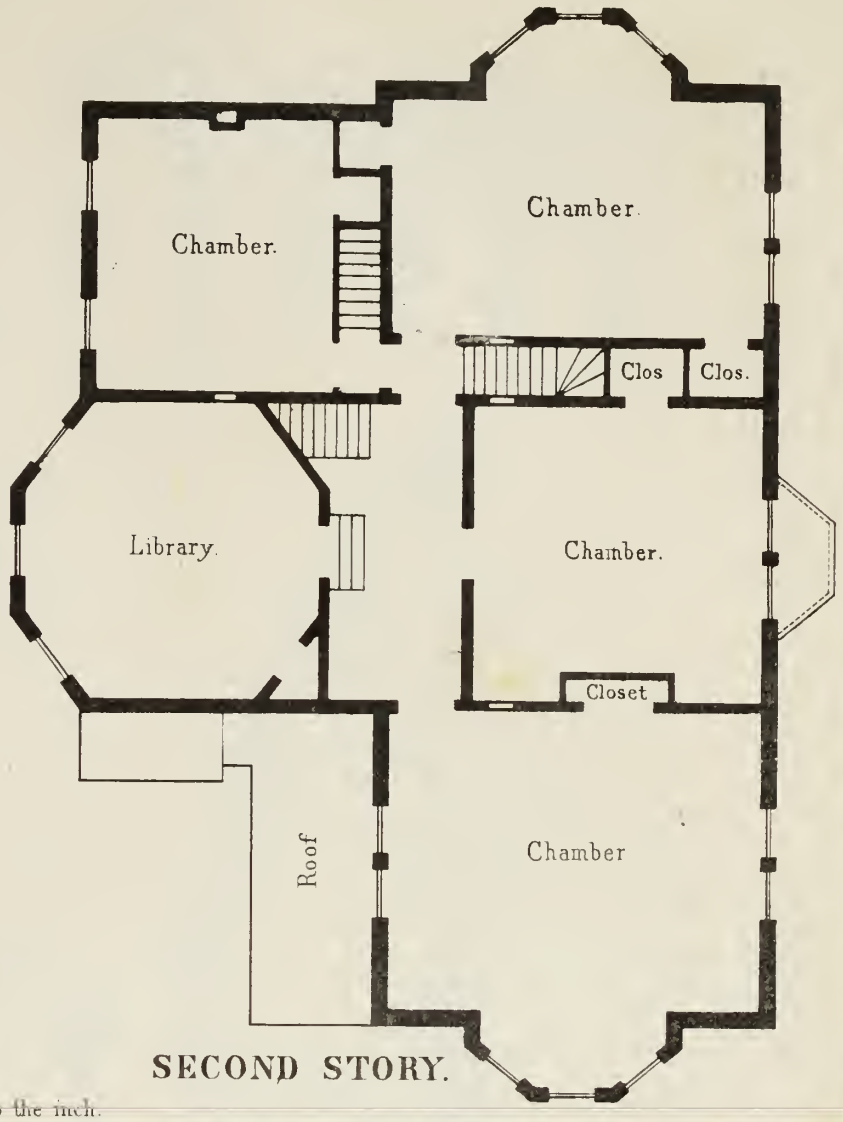
Sam[l] Sloan. Arch[t]

P.S. Duval's Steam Lith. Press Phila[a]

GOTHIC VILLA.



FIRST STORY.



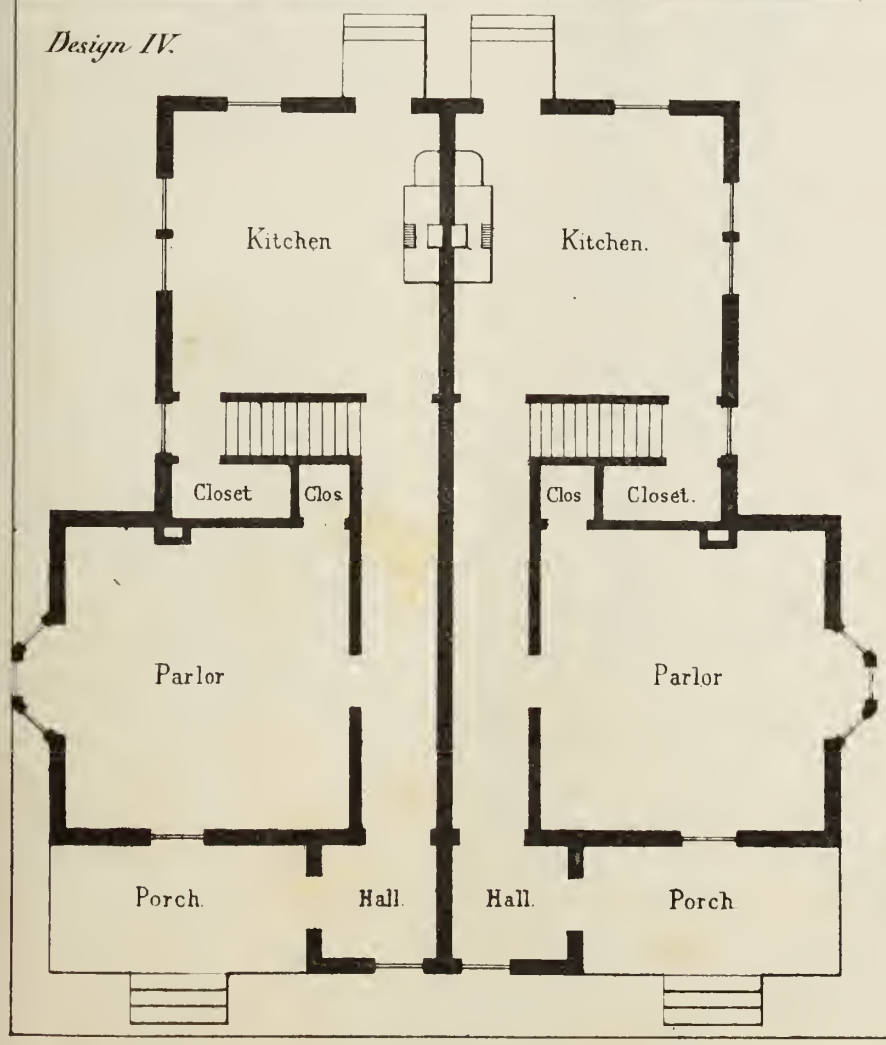
SECOND STORY.

Scale 10 ft to the inch.

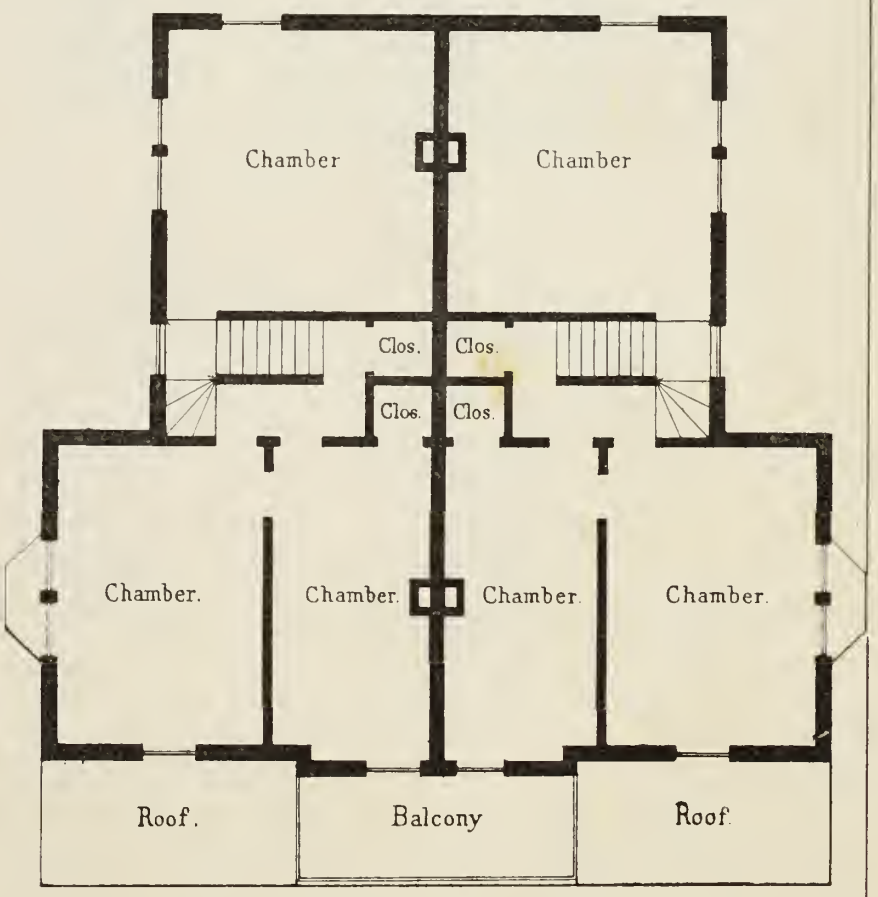
GROUND PLANS.

Design IV.

Pl. XV.



FIRST STORY.



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SECOND STORY.

Scale 10 ft to the inch.

GROUND PLANS.

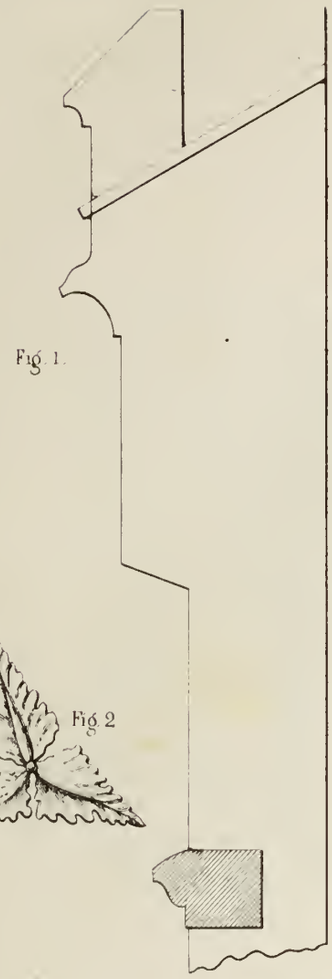


Fig. 1.

Fig 2

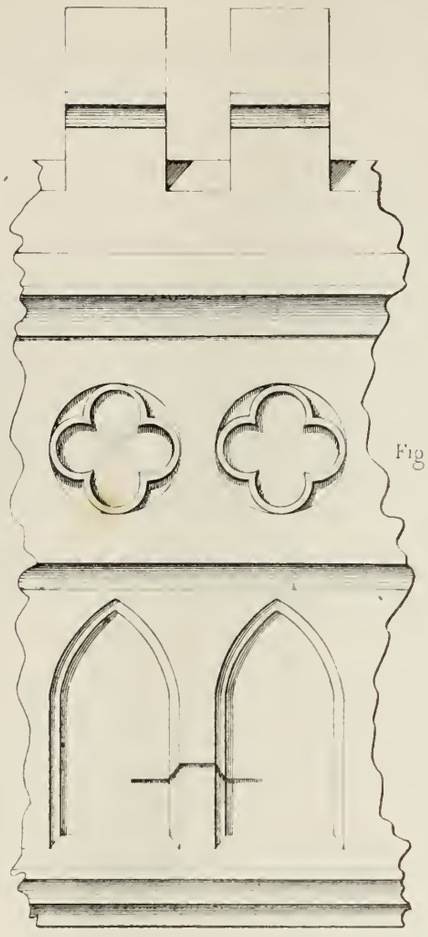


Fig 3

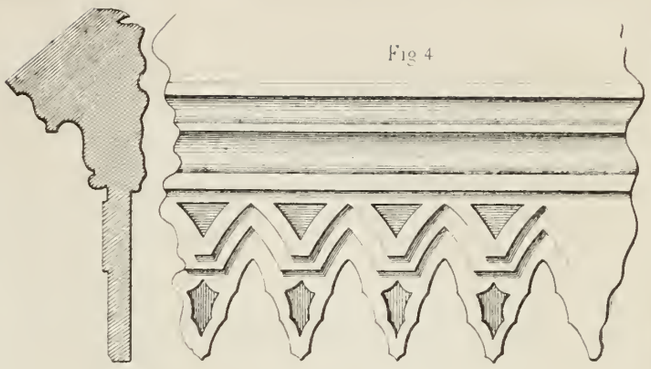


Fig 4

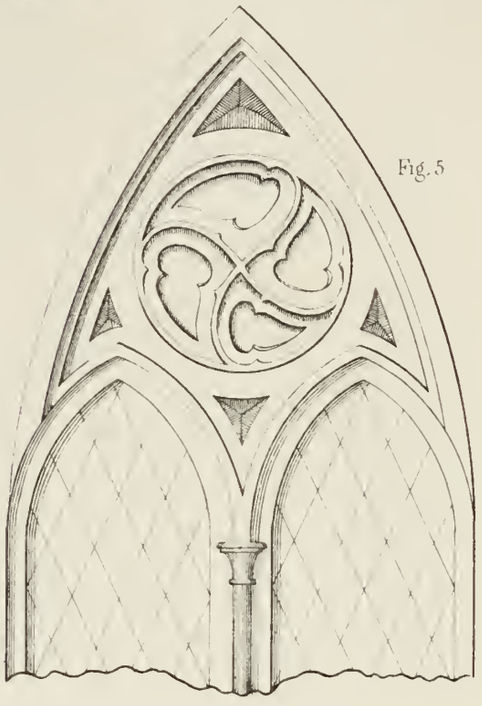
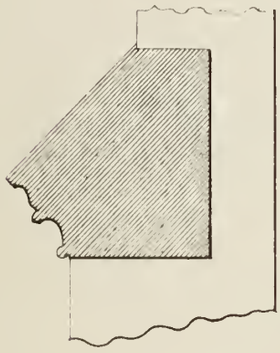


Fig. 5



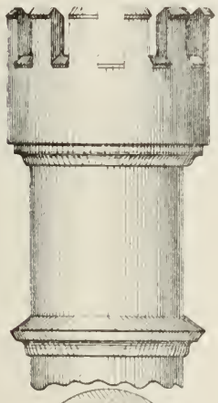
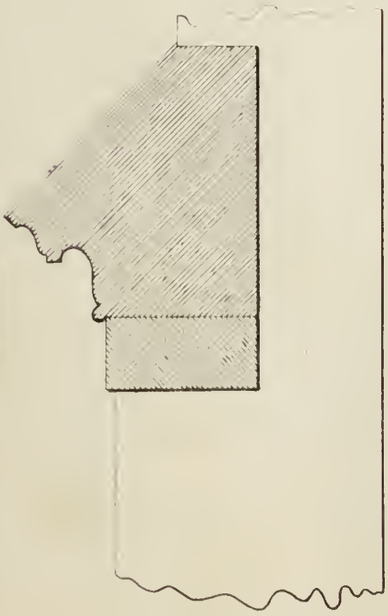


Fig 7.

Fig 6



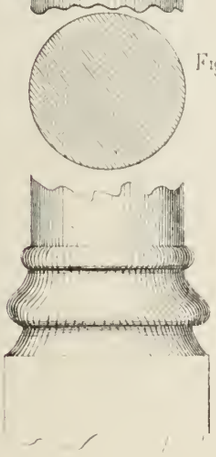


Fig. 8

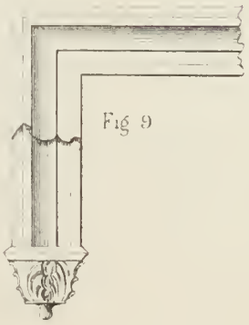


Fig 9

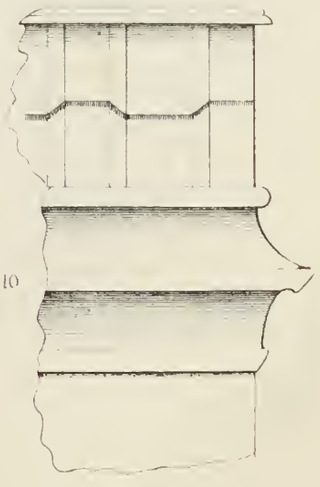


Fig 10

Scale ¾ inch to the foot

DETAILS.

P S Duval's Steam lith Press Philad.ª

ESTIMATE

OF THE COST IN THE ERECTION OF DESIGN THIRD.

We give below a list, with the prices annexed, of all the materials required for the erection of design third. The sums mentioned comprise not only the cost of the material but also the cost of the work required for preparing, placing, and finishing the same. Thus against the item Brick, we have placed $10.50 per M., which amount includes all other material and all work required in laying, i. e., $10.00 per 1000 "in the wall." All carpenter's and joiner's work, however, is included under the head Workmanship, except the doors, windows, &c., which are generally made by machinery.

The prices are those which prevail in and near Philadelphia, but variations at other places may readily be substituted.

Excavation,	300 yds.	@ 20 cts. per yd.	$ 60.00
Stone,	600 perches	@ $2.00 per perch,	1200.00
Dressed Stone,	- - - - -		120.20
Rough Casting,	743 yds.	@ 40 cts. per yd.	297.00
Plastering,	1900 "	" 20 " " "	380.00
Slating,	2400 ft.	" 12½ " " ft.	300.00
Joists,	4560 "	" $12.50 per M.	57.00
Rafters,	2280 "	" " " "	28.50
Scantling,	5000 "	" 12.50 " "	62.50
Flooring,	6000 "	" 30.00 " "	180.00
Roof sheathing,	2500 "	" 12.00 " "	30.00
Assorted Lumber,	11000 ft.	" 25.00 per "	275.00
Brick,	18000 ft.	" 10.00 " "	180.00
Doors, 19, 1¾ in. thick,		" 4.25 each,	80.75
Doors, 24, 1¼ " "		" 2.25 each,	54.00
			$3304.95

Window Frames, Inside Shutters, and Sash,	-	@ $16.00 each,	$544.00
Window Frames and Sash,	21 "	7.00 each,	147.00
Workmanship,	- - -	-	675.25
Tining,	- - - -	-	200.00
Hardware,	- - - -	-	475.00
Furnace and Registers,	- -	-	125.00
Mantels,	- - - -	-	130.00
Painting and Glazing,	- -	-	430.00
Stained Glass,	- - - -	-	60.00
			2786.25
			3304.95
Total cost of the building,	- -	-	$6091.20

TABLE OF GLASS.

We are induced to insert here a table in order to obviate the difficulties which so often occur in purchasing glass for buildings. In ordering glass the purchaser knows the size and the number of lights to be used, but is at loss as to the number of boxes required. Every box contains fifty superficial feet of glass; hence by reference to the table the number of boxes required is readily ascertained.

NUMBER OF LIGHTS TO THE 100 FEET.

Sizes.	Lights.	Sizes.	Lights.	Sizes.	Lights.	Sizes.	Lights.	Sizes.	Lights.	Sizes.	Lights.
6 by 8	300	11 by 12	109	13 by 14	79	15 by 15	64	18 by 18	44	24 by 30	20
7 by 9	229	11 by 13	101	13 by 15	74	15 by 16	60	18 by 20	40	24 by 32	19
8 by 10	180	11 by 14	94	13 by 16	69	15 by 18	53	18 by 22	36	25 by 30	19
8 by 11	164	11 by 15	87	13 by 17	65	15 by 20	48	18 by 24	33	26 by 36	15
8 by 12	150	11 by 16	82	13 by 18	61	15 by 21	46	19 by 19	40	28 by 34	15
9 by 10	160	11 by 17	77	13 by 19	58	15 by 22	44	19 by 20	38	30 by 40	12
9 by 11	146	11 by 18	73	13 by 20	55	15 by 24	40	19 by 22	34	31 by 36	13
9 by 12	138	12 by 12	100	13 by 21	53	16 by 16	56	19 by 24	32	31 by 40	12
9 by 13	123	12 by 13	92	13 by 22	50	16 by 17	53	20 by 20	36	31 by 42	12
9 by 14	114	12 by 14	86	13 by 24	46	16 by 18	50	20 by 22	33	32 by 42	10
9 by 16	100	12 by 15	80	14 by 14	73	16 by 20	45	20 by 24	30	32 by 44	10
10 by 10	144	12 by 16	75	14 by 15	68	16 by 21	43	20 by 25	29	33 by 45	10
10 by 12	120	12 by 17	71	14 by 16	64	16 by 22	41	20 by 26	28	34 by 46	9
10 by 13	111	12 by 18	67	14 by 17	60	16 by 24	38	20 by 28	26	30 by 52	9
10 by 14	103	12 by 19	63	14 by 18	57	17 by 17	50	21 by 27	25	32 by 56	8
10 by 15	96	12 by 20	60	14 by 19	54	17 by 18	47	22 by 24	27	33 by 56	8
10 by 16	90	12 by 21	57	14 by 20	51	17 by 20	42	22 by 26	25	36 by 58	7
10 by 17	85	12 by 22	55	14 by 21	49	17 by 22	38	22 by 28	23	38 by 58	7
10 by 18	80	12 by 23	52	14 by 22	47	17 by 24	35	24 by 28	21	40 by 60	6
11 by 11	119	12 by 24	50	14 by 24	43						

LOCATION.

IN the succeeding portions of this work, it is our especial purpose to furnish such a series of designs as will gratify all fancies, and illustrate the best styles; and at the same time to demonstrate that, in domestic architecture, good taste and every refined elegance are generally to be found in union with comfort and moderate expenditure. But it must not be forgotten, that the peculiar charm of this species of architecture consists in giving expression to Nature, and in harmonizing the abodes of man with those characters of natural beauty and repose, and sometimes of grandeur, which the arbitrary and restrained conditions of city life do not permit.

It is from oversight in this particular that we meet with so many instances in the vicinity of our large cities, of architectural combinations, pleasing in themselves both as to form and color, but made deformities by being brought into violent contrast with their opposites in nature. We do not look for the Swiss cottage against the flat horizon of a prairie land, nor among the high Alps for the casemented villa of southern France or Italy. However simple or picturesque, however full of grandeur or quiet repose the landscape, its crowning feature ought ever to be the structure, whether humble or stately, that denotes the habitation of man. Both should be in complete harmony and adaptation; for hill-side and plain, grove and river bank, each and all convey a meaning which can never be disregarded without a sacrifice of architectural taste, of propriety, and generally of comfort. Every day's observation reminds us that these suggestions, however obvious, are too often overlooked, and we should therefore fall short of our chief design in this publication, if we did not, from time to time, offer a few pertinent hints on the different localities, both in our vicinity, and in other sections of our diversified country.

There are many such around and near our own city, which properly call our attention first; and which in natural beauty and advantages, as well as in rapid improvement, may fairly challenge the most favored spots in other vicinages. The growing number of country residences in and near such places as Florence, Reverton, and Germantown, is a pleasing indication of the progress of public taste in this region; or, to come nearer home, our charming suburban neighbor Hamilton Village affords a fine instance of natural beauty graced, not banished by art. By some good fortune or better Providence it has enjoyed an almost entire exemption from those invasions of brick and mortar which have so sadly disfigured the fair country in most directions around our city. Its daily chimes are mingled with those which measure our busy hours and ring our city alarms; and though literally "within the sound of Bow-Bells," we know of no country village within a hundred miles of us, which contains so much of rural loveliness and repose, and exhibits

in its prevailing features so little cockneyism. These are the spots that in their style of architecture and its accessaries more truly attest the progress of refinement and culture, than the most lavish expenditure upon city mansions.

The grand object of this series is to furnish designs and practical suggestions on the erection and location of rural and suburban residences; and thereby promote the tasteful growth of such places, in the environs of our cities, as have been named; it being the only effectual means of setting limits to a style of building which, if extended much further under the spur of speculation, will in a few years banish natural scenery to points accessible only by the steamboat or railroad.

A DOUBLE COTTAGE.

DESIGN FOURTH.

This is a simple design suited either for a village or suburban dwelling. It is intended for small families who desire to live plainly but comfortably. The fact of its being double may give rise to an objection with some, but it certainly has advantages, which a practical man cannot overlook. With the same expense a much more comfortable and handsome building may be erected on this plan, than if each were designed separately; for there is certainly less work and less material required, and hence a difference in cost. Besides this, it is in most cases far from being unpleasant to have agreeable neighbors within ear-shot, more especially if they are another branch of the same family. But these are old sayings, for the thousand double buildings in every direction prove that there are others who think as we do.

Plate XVII. gives the front elevation of the design. The upper story wall of the gable front sets back within twelve inches of the main wall, as is exhibited on the plans, thus making a balcony over the vestibules, surrounded by an iron railing. This balcony might be made to extend over the front porches. The main entrance door is at the end of the porch opening into vestibules in the gable front. All the outside walls and the main division wall are to be built of quarry building stone, and those outside are to be faced with rubble work, ridge-pointed. All other divisions are to be stud partitions. The flues are brick. The main roof is of slate; those of the front porches and bay windows of tin.

The plans of the first and second stories will be found on Plate XV. They show that each of the dwellings will accommodate a family of four or six persons. There are also two commodious garret rooms in the design, which do not appear upon the plans. The back chambers, it will be seen, are several steps below the floor of the second story main building; hence the roof of this part is lower than the main roof. If it were desired to extend this plan, there might be a basement kitchen under the back-room, which would then be used for a dining room. A back verandah also might be placed in an angle of the kitchen and parlor walls.

We give no plate of details in connexion with this design, because, being plain and simple, they may be readily taken from the elevation. Nor was it deemed necessary to prepare a specification. Any contractor with our specifications of other buildings and the descriptions herein contained before him, can easily write out a complete specification for this.

The cost of this cottage in this vicinity, where stone can be procured and delivered for a dollar a perch, built according to the plates and general description, with a cellar throughout its entire extent, and finished handsomely in all parts not described, will be about $2200.00, or $1100.00 for each dwelling. If brick, at six dollars a thousand, be substituted for stone, and rough-cast, it will increase the cost about $200.00 on the whole.

ITALIAN RESIDENCES.

DESIGN FIFTH.

This building is designed for suburban residences. It is in the Italian style which prevails so extensively in our cities. The general appearance of it displays finely that half-town and half-country expression so essential to handsome suburban dwellings. The main entrance appears beneath the side porches on the front elevation Plate XVIII. The bay windows on front, and observatory, are highly ornamental features, and could not be omitted without doing violence to the tasteful appearance of the building.

The plans of the first and second stories are exhibited on Plate XIX. Each dwelling will accommodate a family of eight or ten persons. A very convenient back porch might be placed in the angle of the dining-room and kitchen walls.

Plate XX. consists of details. Fig. 1, bracket and cornice of the main roof. Fig. 2, cornice of side porches. Fig. 3, cornice of the bay windows. Fig. 4, base of the bay windows. Fig. 5, bracket and cornice of the observatory. Fig. 6, posts and bracket of the side porches. Fig. 7, corbel of the second story windows.

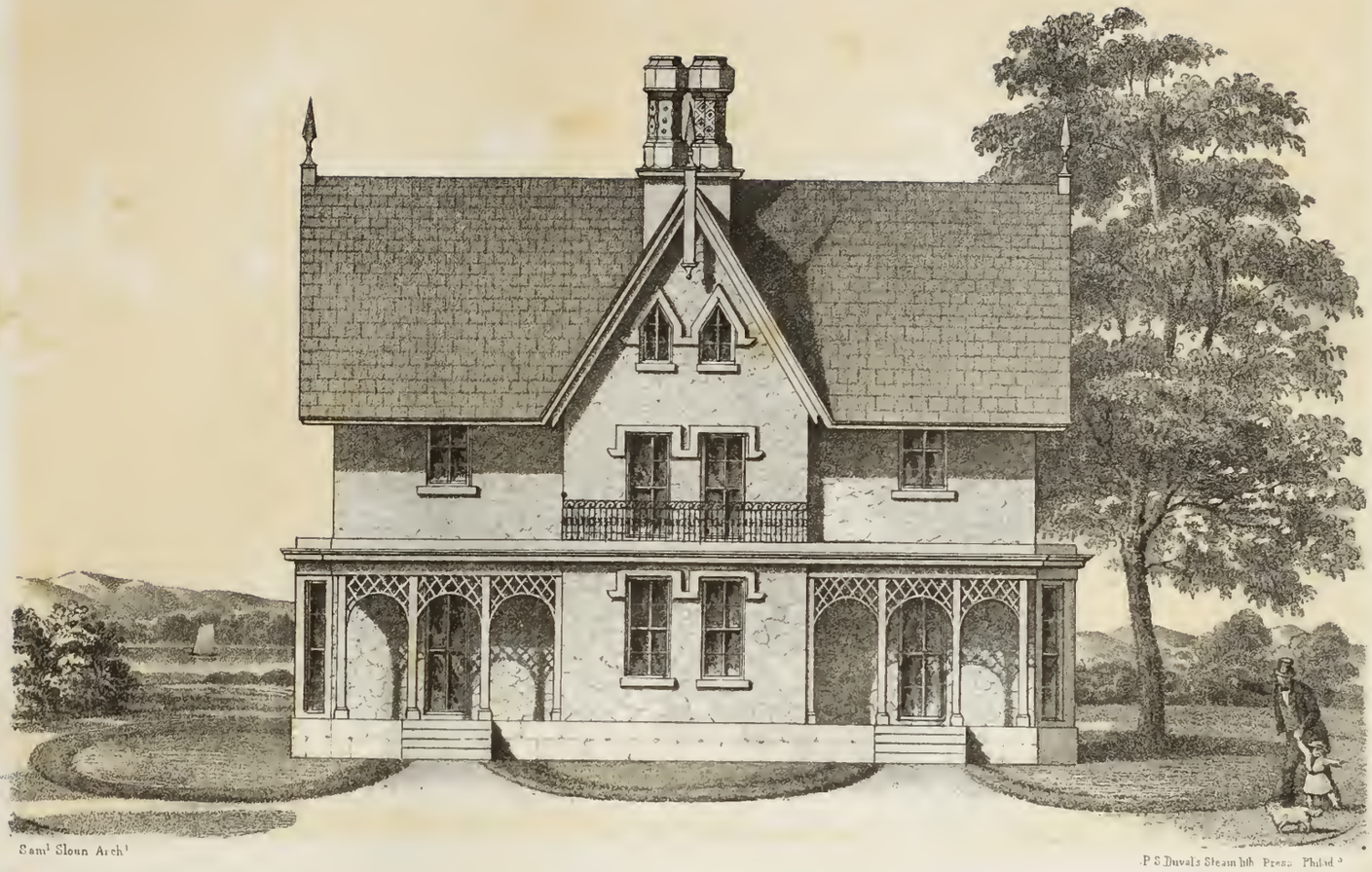
We give no specification under this design for similar reasons to those given in the previous article, but we annex a general description, by the aid of which, a specification may readily be prepared.

The entire extent of the front, including the wings, is forty-two feet. That of the side is forty-eight feet. The building is two and a half stories high; the first story being twelve feet eight inches to the top of the second floor; the second story being eleven feet four inches to top of the third floor; and the half story being eight feet in the clear. The main roof is to pitch four feet. The observatory is fifteen feet square and eight feet high in the clear. The cellar, throughout the entire extent of the building, is to be six feet six inches deep. The dimensions of the different apartments may be taken from the plans. The outside walls are of stone covered with mastic, which is divided into blocks and tinted to represent brown stone. The angles of the front projection have quoins of Connecticut brown stone with the edges bevelled, and a water table of the same is built around in the wall. The windows are all casemented, and have inside shutters to the first and second stories, in two folds to each jamb, and are hung with the usual back flaps. The outside and principal room doors of the first and second story, are one and three-fouths of an inch thick with two and a half inch mouldings and fillets. All other doors are one inch and a quarter thick and moulded on one side. All glass, in the first story front and sides, is the best American crown glass, the rest may be of an inferior quality. The roof is overlaid with the best quality of leaded tin. The wood of the interior has three coats of paint. The exterior has four coats and is sanded.

The cost of the whole building will be between $2400.00 and $2800.00 if erected in accordance with the elevation, plans, details, and the above general description.

Design IV

Pl. XVII.



Sam[l] Sloan Arch[t]

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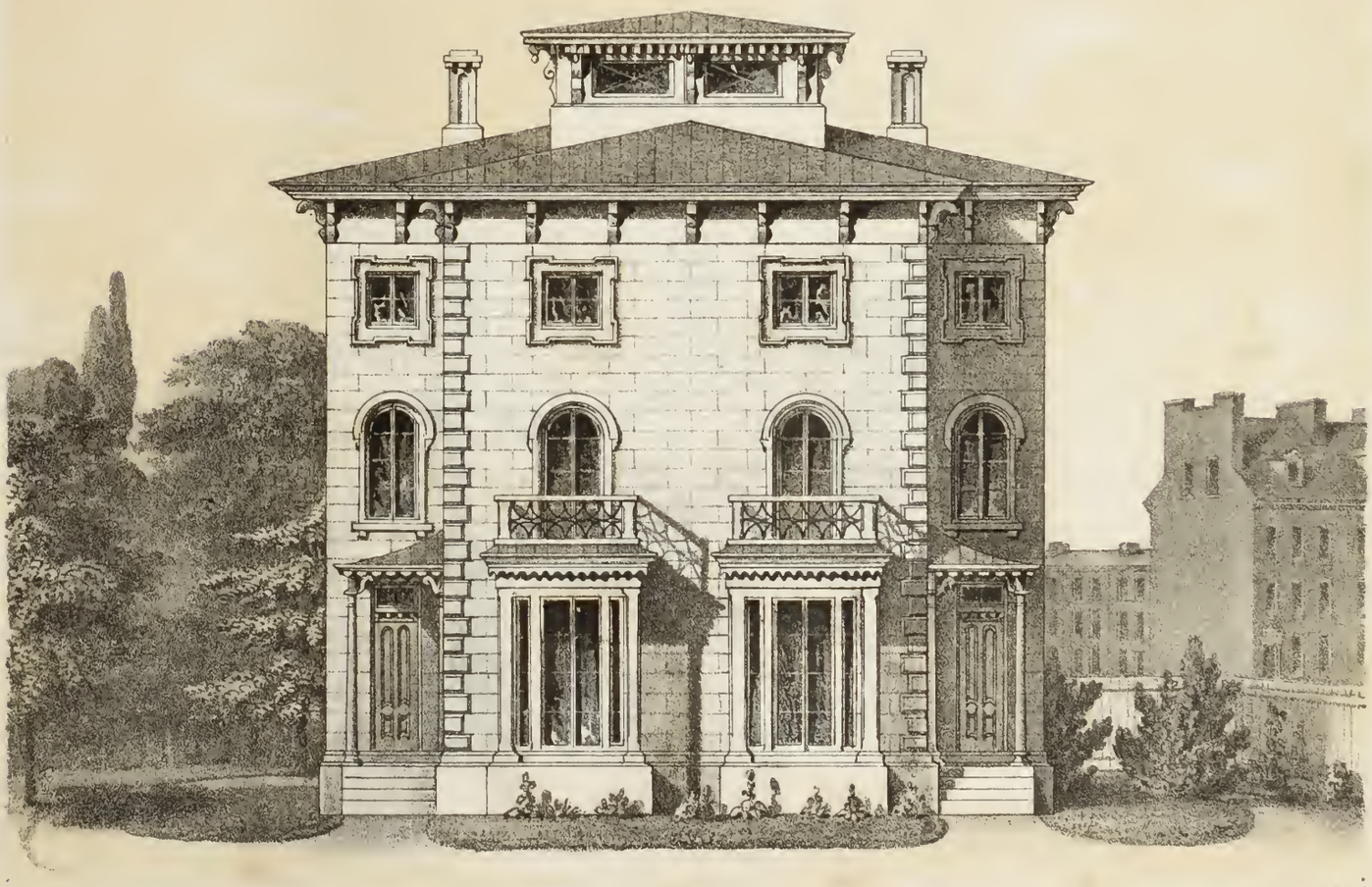
DOUBLE COTTAGE.

Design V.

Pl. XVIII.



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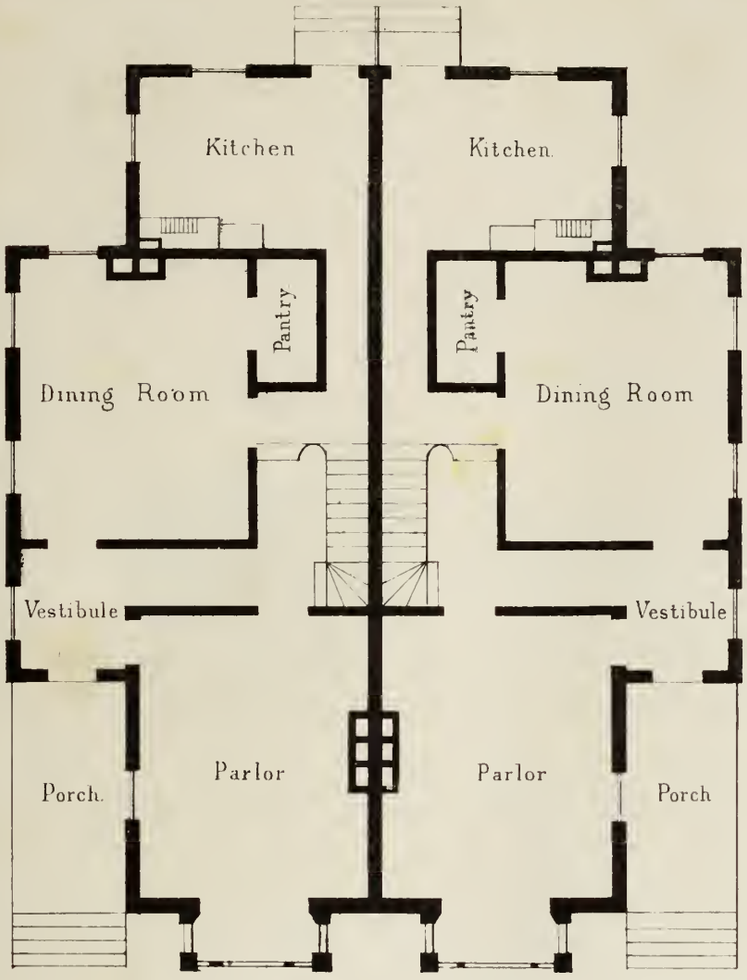
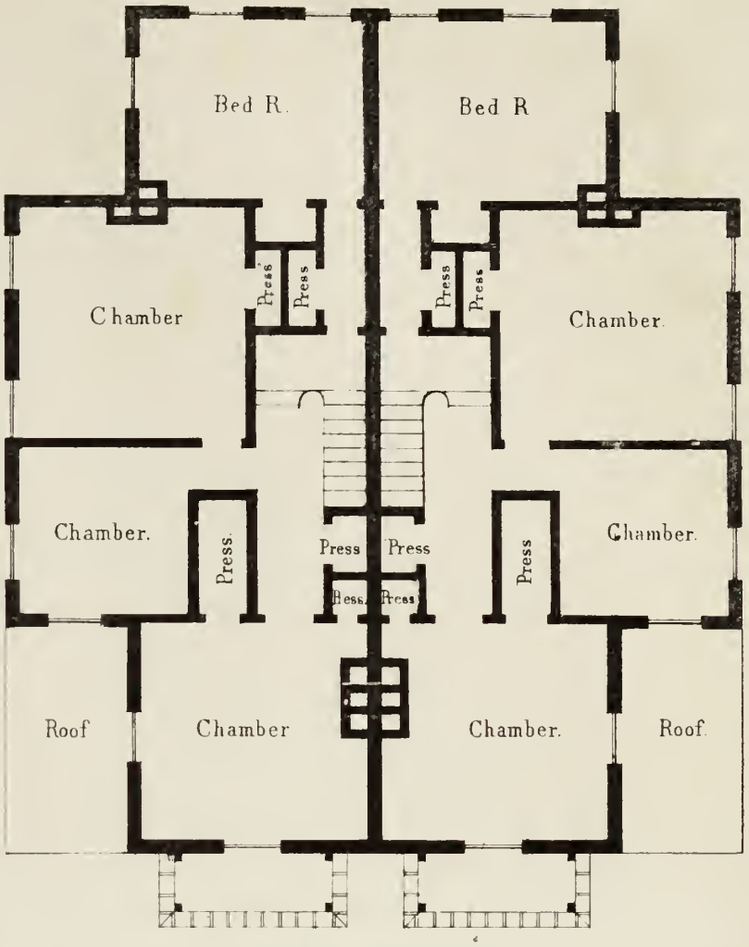
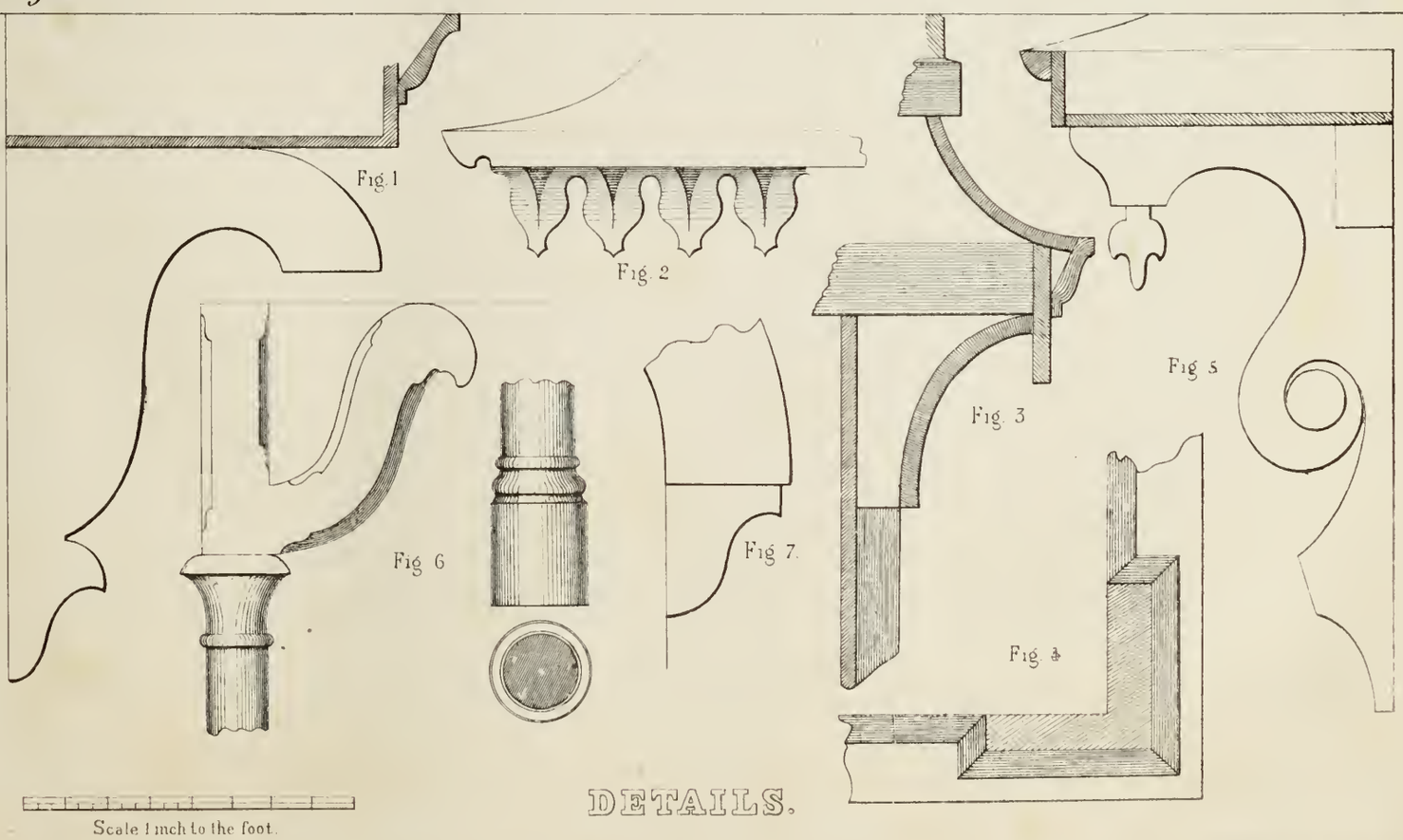
ITALIAN RESIDENCES.





FIRST STORY. Scale 10 ft to the inch. **SECOND STORY.**

GROUND PLANS.

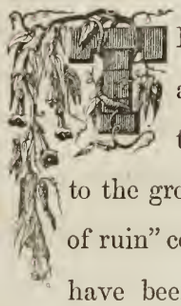


Scale 1 inch to the foot.

DETAILS.

P. S. Duval, Sc. Amicitiæ Press, Phila.

ITALIAN ARCHITECTURE.



HE Goths who inundated Italy and swept away the last vestiges of Roman strength, sought also to destroy and obliterate all remaining traces of the grandeur, pomp, and refinement of the empire, as exhibited in its mighty works. Magnificent temples and palaces were razed to the ground, and the greater the work, the more sure was it of destruction. But these "architects of ruin" could not annihilate. "The rude heaps that had been cities, clad the ground with history," and have been the eager study of all succeeding ages. When the state of society became somewhat more calm, the materials of these structures, which lay in vast confusion, formed, so to speak, artificial quarries, from which new cities were built. It is easy to imagine what incongruous combinations must consequently have arisen. The different orders were mixed, and highly sculptured ornaments were placed in close connection with coarse, rough work; and hence the manner of building at this time cannot justly claim to be a style in architecture. But this could not long exist among a people of whom natural good taste is a characteristic, and accordingly we find many buildings of an early date that commanded the admiration of Michael Angelo.

The present national style cannot be said to have existed earlier than the fifteenth century. At this time the writings of Vitruvius, having been discovered in manuscript, were published, and thoroughly studied. He was a Roman architect, who flourished under the reign of Augustus, and wrote his work about the time of the Christian era. It contains a complete and excellent, but oftentimes obscure account of both Grecian and Roman architecture. To this we are indebted for the most of our knowledge of the art in ancient times, and for the great change which has been wrought in it throughout the enlightened world. Brunelleschi was one of the first who studied so enthusiastically this work and the relics of past ages. He remained in Rome a long time, measuring and minutely examining her noble remains, and did much to restore the knowledge of the art and diffuse a taste more correct. In the year 1407, he offered to the assembly of architects and engineers, at Florence, his design for the erection of a dome on the cathedral of St. Maria del Fiore, and was hissed from the hall for his pains. He subsequently, however, was appointed as the architect, and the design was completed. Other domes were erected in every direction, until that of St. Peter's, by Michael Angelo, set all competition at defiance. Between these two great men there flourished many architects, composing the "Cinquecento School," all of whom labored with a devotion and zeal that speedily perfected the art. It may be well remarked, that these men were not only architects, but sculptors, painters, musicians, and even poets. They seem to have studied the fine arts *en masse*, and

many mastered them all. Their refined taste is yet reflected from Italian architecture, for since then there has been little or no change in the principles of the style, variations occurring only in details.

Alberti, one of these architects of the fifteenth century, wrote a work on the subject, which was afterwards followed by the works of Serlio and Palladio, all of which were, upon their publication, translated into French, German, Dutch, and English. As a result of this, a radical change soon began to show itself throughout Europe. In England the suppression of monasteries had prepared the way, and there were several architects who labored for the introduction of the new style. Inigo Jones, though not the first, was one of the greatest reformers. He spent some years in Italy, studying under the patronage of the Earl of Pembroke, and was afterwards appointed Royal Architect. The illustrious Sir Christopher Wren, who has been called the greatest of all architects, completed the change, which may be regarded as established throughout the cities not only of England, but of all Europe, soon after the middle of the seventeenth century. It has since universally prevailed.

The deep veneration which has always existed for antiquity, would certainly cause the moderns to imitate in every particular the ancient models, were it possible; but these models, though specimens of exalted taste, and suited to their times, are utterly inadequate to supply our wants, and illy accord with our customs. In public buildings we sometimes see them reproduced with a creditable finish and seeming appropriateness, but for domestic purposes they are altogether insufficient. The arts of construction too, are much improved, and give us great advantages. In unwearied patient labor, careful finish and tasteful skill, the ancients are unsurpassed, but in manual dexterity, tools, machinery, and adaptation of material, we excel. Among other things, the introduction of glass has made a great difference. The excavations at Pompeii prove that it was used latterly, to some extent, by the Romans, but we know that Nero gave a vast sum for a pair of drinking glasses; hence it could not have been used as a material for windows to any great extent. Its place was supplied by thin canvass, or a highly transparent mineral, which they called speculum. After the art of manufacturing glass became better known, it gave the window, unlike its former position, a prominent place in architectural designs.

Setting aside, however, these minor differences, it is utterly impracticable for the moderns to build on the magnificent scale which the Roman style demands. Among that people, every villa was a palace, built from the extorted revenues of large provinces, and on one of their public edifices an amount was expended that would build for us a handsome city. In short, the construction of society is, ever since has been, and we hope ever will be, totally different. The Italian architects followed as nearly as possible the footsteps of antiquity, but for these reasons they varied considerably from the standard. Ever since, the difference has been gradually increasing, and their peculiar combinations being altogether abandoned, we only retain general principles and ornamental details.

Before giving the characteristics of this style, it is well to mention the distinction which exists between the mode of building in the city and in the country. Exterior architectural ornaments in the city are

generally confined to a rectangular front, while in the country, where all sides are exposed, much more attention must be paid to general effect. But without attempting to define the obvious difference which obtains between the two, we will confine all future remarks, as the nature of our work demands, to isolated buildings.

Most generally, Italian villas have an irregular outline from every point of view. The predominant figure is the rectangle, but many being introduced and so disposed as to break in upon each other, the irregular outline is formed without difficulty. The angular effect is relieved by the semi-circular arch which is freely used. Great license is also permitted in the ground plans, thus admitting almost every possible arrangement of apartments. This results probably from the fact that the buildings are generally erected on uneven ground. A most prominent and almost universal feature is the square tower, or, as it has been latterly called, the campanile. Properly, the campanile is a bell tower, built nigh a church, but detached from it, as the leaning tower at Pisa. The term is now frequently used as applied above. Pliny, in describing Roman villas, speaks of a tower which had in its upper story a dining room, so that guests, while gratifying their appetites, might feast also their eyes on fine views around. In modern times such a use of the campanile is unknown, but so universally is it introduced, that we look for it in every Italian landscape. It overlooks all parts of the house, and has balconies, and other ornamental features, which give it grace and finish. The principal entrance is generally in its first story, which also often affords a good position for the main stairway. It differs from a steeple, or an ordinary observatory, in having at least one of its sides visible from eaves to base. The roof, both of the campanile and main building, is never steep. In Italy it is generally composed of tiles, which form a beautiful and permanent roof. Tin is used more with us, and is so arranged as to have nearly the same effect. It has been stated that gables do not occur, but this is incorrect: we simply cite Raphael's villa, in the Borghese Gardens. Hip roofs are, however, common. In all cases the eaves are heavy and projecting, being supported by brackets and cantalivers of various patterns. The chimneys are prominent, and serve to give greater variety to the outline. The windows are made double, or treble, and, together with the doors, have either square or arched heads, according to the importance of their position. Bay-windows are frequent. All window and door dressings are made very heavy, and, indeed, throughout there is a tendency rather to boldness than minute decoration. Heavy arcades, porches with large square pillars, verandahs, balconies, antæ, pilasters, quoins, rustic work, and string courses, all often occur. In consequence of the great abundance and variety of the best material in Italy, the walls always present a finished appearance, accompanied by great stability. The best are built of dressed stone; but rough-casting is quite common. Buttresses are often placed against the basement when it is high, which die into the wall just beneath the water-table.

The character of this style is far from being rural, but is genuinely picturesque. The irregularity of the ground plans and vertical outline, and the great freedom allowed in general design, give considerable room for the exercise of taste. In Italy, the surface of the country is greatly diversified by hills and valleys,

and advantage is taken of this in erecting the villas so as to command landscapes. The brow of a steep hill is a frequent location, and adds much to the fine, bold effect of the buildings. In such situations, terraces are much used. The style is, however, by no means incompatible with a level country, but in that case the design is more regular and symmetrical. The adjacent grounds should be kept in a finished state. Statuary, vases, fountains, and other such accessaries are in entire accordance with the style.

Country residences in the Italian style are becoming more and more popular, both here and in the old world. Its great pliability of design, its facile adaptation to our wants and habits, together with its finished, elegant, and picturesque appearance, give it precedence over every other. It speaks of the inhabitant as a man of wealth, who wishes in a quiet way to enjoy his wealth. It speaks of him as a person of educated and refined tastes, who can appreciate the beautiful both in art and nature; who, accustomed to all the ease and luxury of a city life, is now enjoying the more pure and elevating pleasures of the country.

AN ITALIAN VILLA.

DESIGN SIXTH.

This presents another Villa in the Italian style, quite regular and symmetrical in plan, and therefore best adapted to a level situation. The whole appearance of the building is broad, heavy and spreading. If desirable, this expression may be added to by making the eaves of the tower, house and verandah, still more projecting. In its details, it presents many features referred to in the preceding article; but, although true to its origin, it is not an elaborate specimen of the style. It was designed rather as a family mansion, and we are convinced will make a complete, comfortable dwelling.

Plate XXI., the Perspective View, explains our meaning. The broad verandah encircling the house is a graceful and convenient, though expensive appendage. It would be more highly appreciated in a warmer climate than this, but even here our hot summers make it grateful. Comfortable summer residences are never without a verandah. Plate XXII. is a front elevation of the same building.

Plate XXIII. exhibits the floor plans. The house will accommodate a family of ten, servants included. The part of the verandah in the rear may be omitted, and a back porch be placed in the angle formed by the kitchen wall and end of the hall. The flues from the chambers on the right are to be overdrawn so as to meet and issue from the roof at a point corresponding to the one on the other side.

Plate XXIV. consists of details. Fig. 1 is a front view of the Balcony. Fig. 2, side view of the same. Fig. 3, bracket and section of tower cornice. Fig. 4, verandah post. Fig. 5, front door. Fig. 6, bracket and section of main cornice.

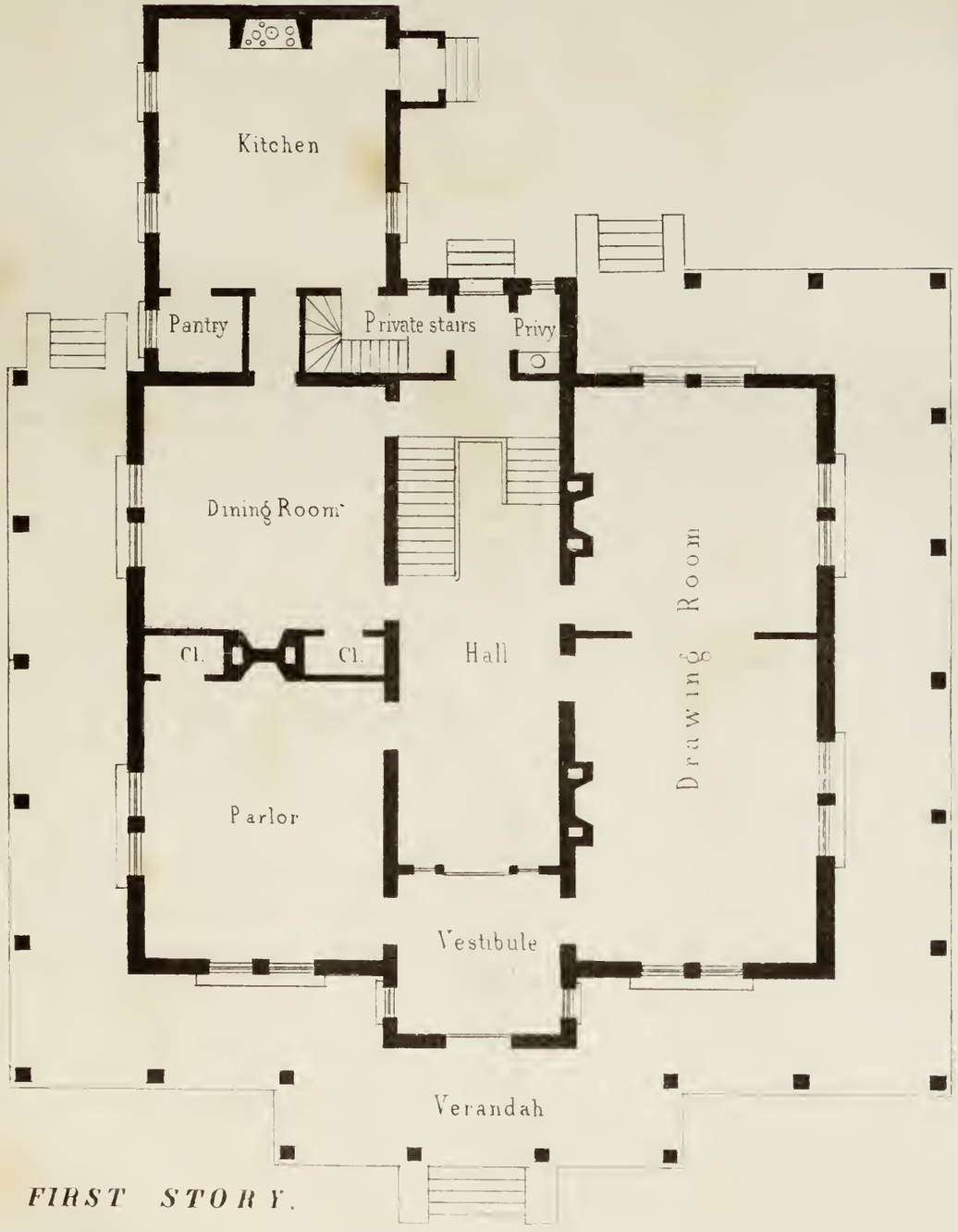
The main walls are of brick, rough-cast and laid off in blocks. The foundations are, however, of quarry building stone, as high as the joists of the first floor. This includes the foundations of the verandah, as high as the base course; from thence brick to the floor. The sill course around the tower, the base course, the outside door sills, and the front steps, are all of dressed stone. The main division walls on either side of the hall are of brick as high as the joists of the second story.

Saml Sloan, Archt P.S. Duval's Steamlith. Press Phila.

PERSPECTIVE VIEW.

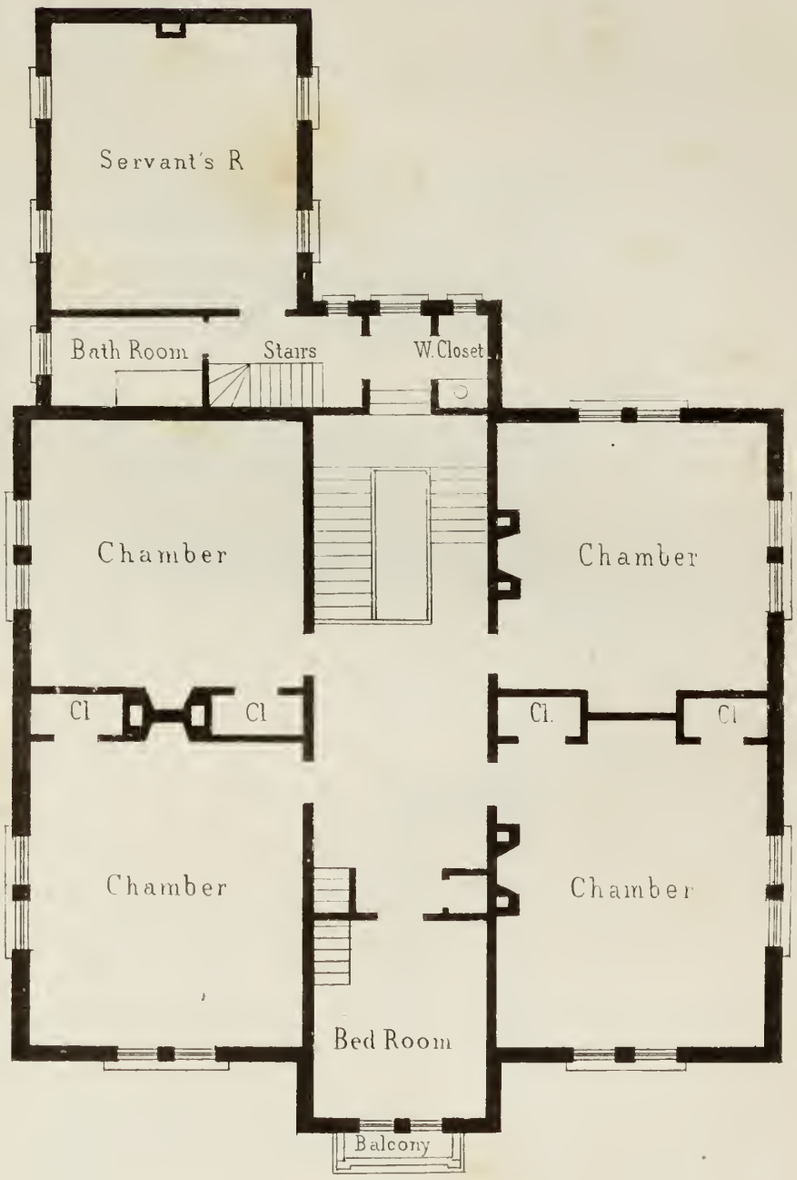
Saml Sloan, Archt P.S. Duval's Steamlith. Press Phila.

ITALIAN VILLA.



FIRST STORY.

Scale 10 feet to the inch.



SECOND STORY.

GROUND PLANS.

P. S. Duval's steam lith. press Phila.

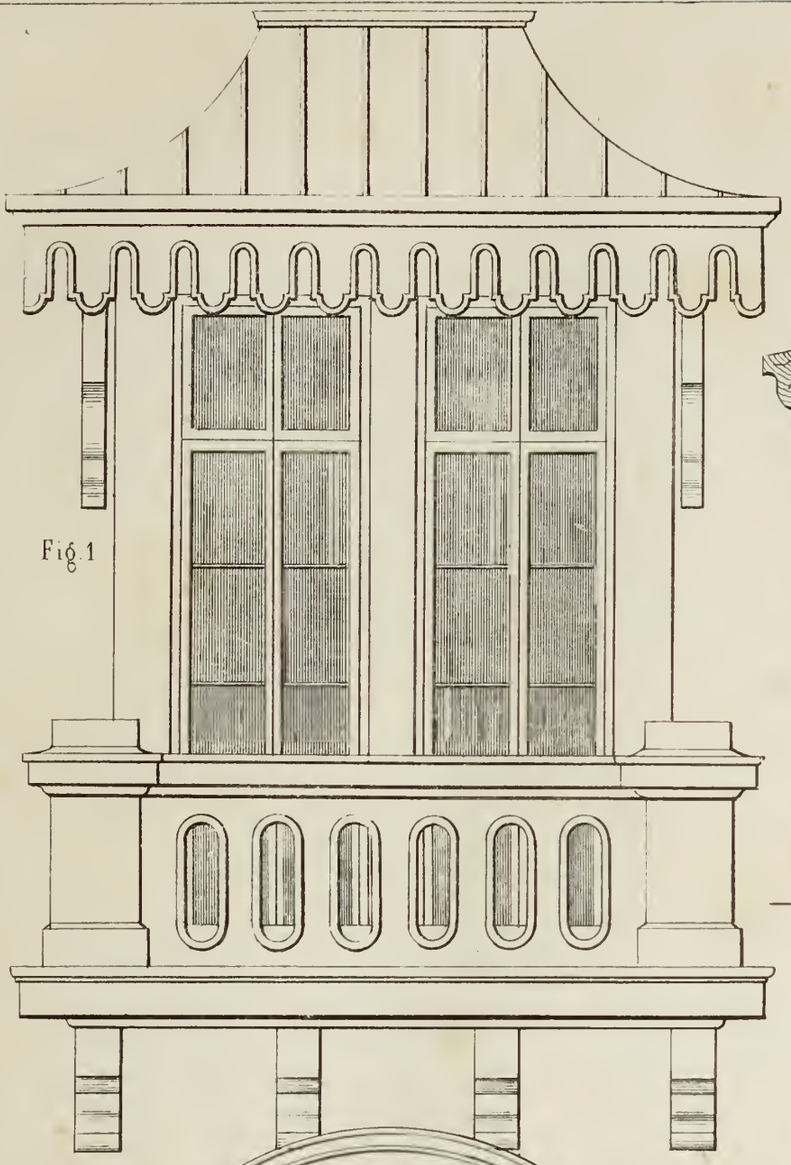


Fig. 1

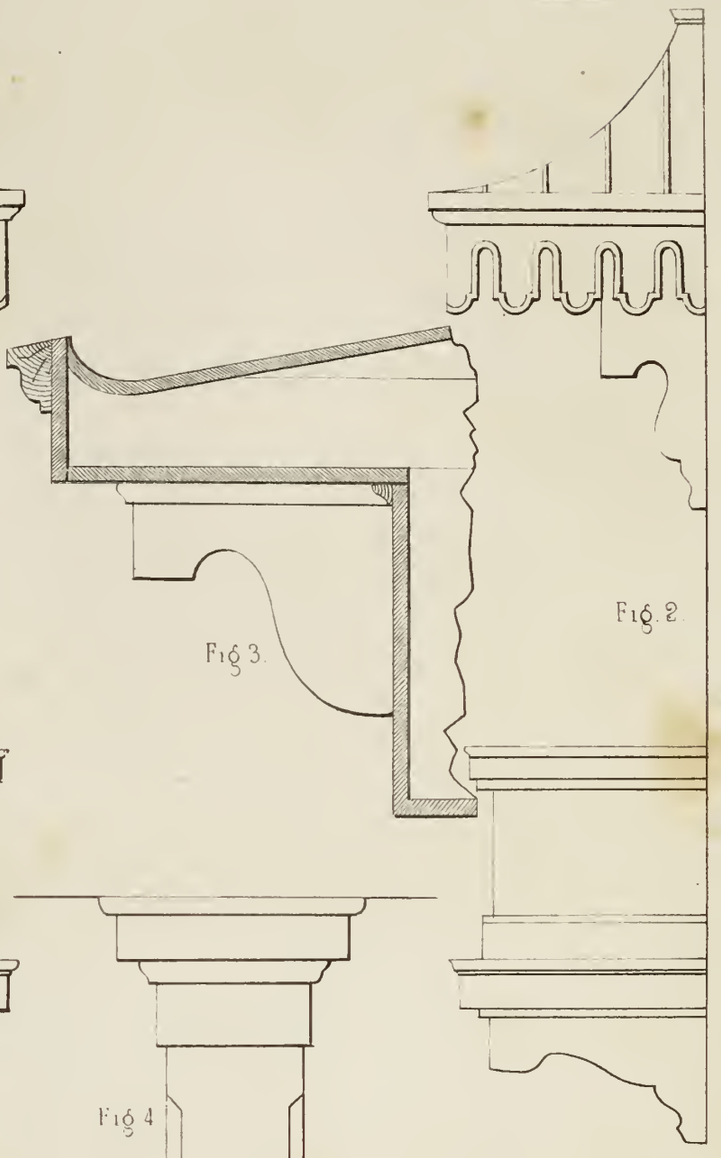


Fig. 2

Fig 3.

Fig 4

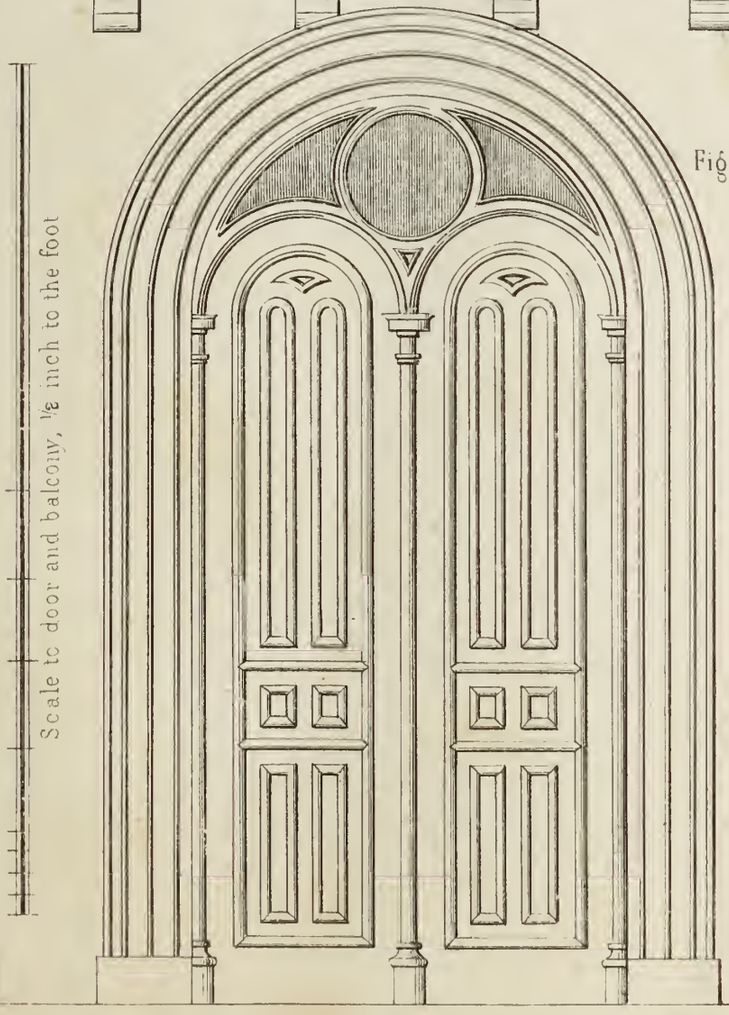


Fig. 5

Scale to door and balcony, ⅛ inch to the foot

Scale, one inch to the foot

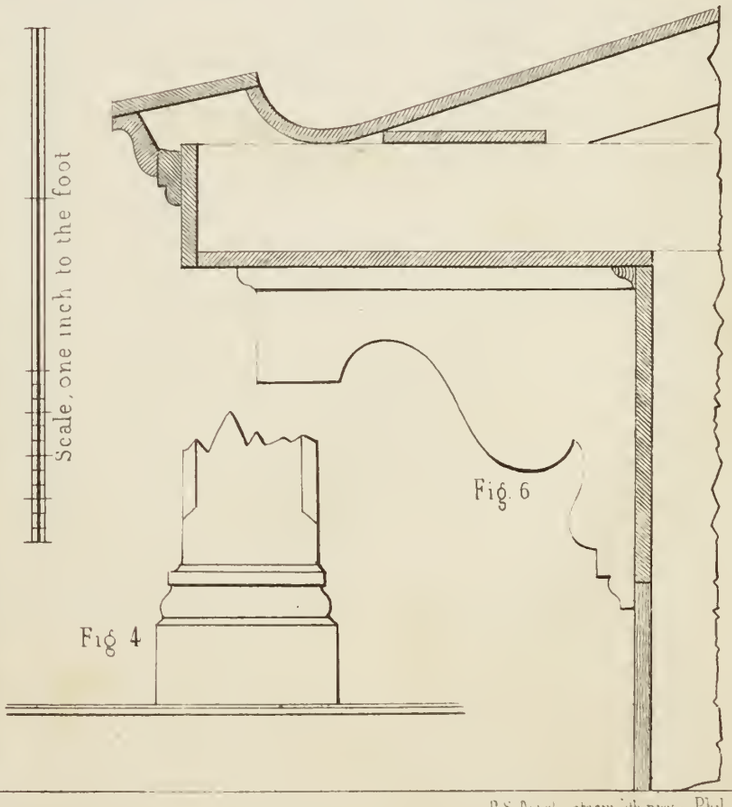


Fig. 6

Fig 4

P.S. Duval steam lith press Phil

DETAILS.

All others are stud partitions. The house is designed to be warmed by a furnace; and for its reception a case, six by eight feet, with double walls of single thickness, four inches apart, is built of hard brick in the cellar.

The outside doors are one inch and three quarters thick, the inside room doors are an inch and a half thick, double-faced, and the closet doors are an inch thick, single-faced. The stairs are of heart pine boards, on three strong carriages; the rail and newel are of mahogany, and the balusters are of maple turned.

The plastering is executed in the best manner, with handsome cornices in the dining room, drawing room, hall and parlor. The drawing room has two centre flowers, the hall and parlor one each.

The roofs are entirely of tin. The central part of that over the main building is flat. All the flues are cased with tin.

The remainder of the building, in its details, is entirely similar to Design First, and hence requires neither further description nor specification. An estimate is given below, which furnishes all other necessary information.

ESTIMATE

OF THE COST IN THE ERECTION OF DESIGN SIXTH.

THE following bill of items is prepared on the same plan as the preceding.

Excavation, 350 yds. @ 20 cts. per yd.		$ 70.00	Window Frames, Inside Shutters, and Sash,	15 @ $22.50 each,	337.50
Stone, 75 perches @ $2.00 per perch,		150.00	Window Frames, Outside Shutters, and Sash,	12 @ $15.50 "	186.00
Dressed Stone,		175.00	Doors, 17, 1¾ in. thick, @ $4.25 "		72.25
Brick, 130,000 @ $10.00 per M.		1300.00	Doors, 25, 1½ " " " $2.75 "		68.75
Rough Casting, 670 yds. @ 40 cts. per yd.		268.00	Tinning,		675.00
Plastering, 1800 yds. " 20 " " "		360.00	Furnace and registers,		175.00
Floor Joists, 4800 ft. @ $12.50 per M.		60.00	Mantles, 8,		200.00
Ceiling Joists, 1500 ft. " " " "		18.75	Hardware,		440.00
Rafters, 1700 ft. " " " "		21.25	Painting and Glazing,		400.00
Scantling, 4500 ft. " " " "		56.25			2554.50
Flooring, 6500 ft. " $30.00 " "		195.00			3665.65
Sheathing, 2200 ft. " $12.00 " "		26.40			$6220.15
Assorted Lumber, 11400 ft. " $25.00 " "		285.00			
Workmanship,		600.00			
Window Frames, and Sash in Tower,	4 @ $20.00 each,	80.00			
		$3665.65			

THE ARCHITECT.

DESIGNING a house is no easy matter. Such abilities, indeed, are required to do it well, that it has become a business, a profession, an art. Men who have devoted their lives to it are, notwithstanding, continually making blunders; then what are we to expect from him who endeavors to build, while destitute of taste, experience, and knowledge of construction? If those who have long studied and practised the art sometimes fail, perhaps he that knows nothing about it might do well to pause before he acts independently. When a pleasing design, with all its concomitants, is found, whose source is good authority, it may be adopted without hesitation; but when a building adapted to some peculiar notions is desired, the only safe course is to communicate these to some experienced Architect, who will elaborate them.

A good Architect must possess just taste, more especially if he aspire to any originality. The existing models are so numerous and so complete as sometimes to require but little tact in adapting them to modern use, but such servile imitation is unworthy of an intelligent man, and of the genius of our age. On the other hand, it is not best to throw away entirely the accumulated knowledge and beautiful designs of the past, and start out nude again to collect. There is between these extremes a course to which taste and reason point; but to pursue this course aright a keen sense of discrimination is necessary. The Architect must also have been, and must be, a hard student and a strong original thinker. Not one whose memory is overloaded with facts, but to whom every fact has added strength; whose mind is expanded by each, and does not again contract, if he chance to forget it. Such an one may throw off the shackles of the past, and yet feel its influence. In his hands the art will advance, but with others it either stands still or retrogrades.

But there is a vast fund of practical knowledge required. The Architect must have a thorough appreciation of the wants of society. He must be well versed in all the arts of construction. There is no necessity for him to possess manual dexterity, but he must be a good judge of masonry, carpentry, and their kindred. He must be acquainted with all the varieties of the best material, and their prices, together with the prices of all kinds of labor. He must also be familiar with all modern improvements which add to the comforts of living.

This is a mere glance at the proper attainments of an Architect. It was said of Wren, that, "since the time of Archimedes, there scarcely ever has met, in one man, in so great a perfection, such a mechanical hand and so philosophical a mind." Besides possessing an eminently practical character, he was named by Newton first among the great geometricians of the age.

When the projector has communicated his wishes to an Architect, the first step taken is to form the ground plan of the design. For a small one story house this is easy, but when there are several stories they must be made to correspond. The arrangements for heating, ventilation, and the admission of light, also create difficulties. After these have been successfully overcome, the next thing is to adopt a style. In doing this, both the peculiarities of the plan, the locality, and the purpose of the building, have to be taken into consideration. Then the elevation must be sketched. Much taste and knowledge are required in this. All the general features and minute decorations must be carefully designed and arranged, so as at once to be true to the style, and form a graceful, well proportioned whole. He finally prepares a specification and bill of the cost of each thing concerned in the building, the sum of which gives the general estimate. From now until the completion of the building he holds himself in readiness to give any information to the contractor, and acts as a referee between him and the proprietor. From time to time during its progress, he gives, on examination, certificates to the contractor of the completion of certain parts of the work according to contract, without which the latter cannot properly draw upon the owner. This is the usual arrangement. The Architect's bill is proportioned to the cost of the building, generally about three per cent. on the whole.

There is one abuse in particular to which the Architect is subject, and that is, after a design has passed from his hands, the projector sometimes makes changes in it without his consent, and even without consulting him. Luckily this self-conceited ignorance is often punished by the result. An intelligent man will employ an Architect who is his superior in matters connected with building, and having done so, will always deferentially advise with him upon any changes or additions he may wish to make. Besides regarding his own good in this, he remembers that an observer of a handsome building as often asks the name of the Architect as he does that of the owner, and if there is any thing bad in the design, the Architect gets the credit of it. He will avoid, therefore, doing any thing which may materially injure the other in reputation and business.

AN ELIZABETHAN VILLA.

DESIGN SEVENTH.

This Villa is in the style which we have technically termed Debased Gothic. We have however subscribed it Elizabethan, because it is more popularly understood as such. It corresponds to the old manor-houses erected during Elizabeth's reign, many of which are yet extant. This is more regular than most of the originals, the plan being rectangular, but the convenience and compactness of it are thereby promoted.

Plate XXV. gives the general appearance of the building in perspective. Plate XXVI. is the front elevation, drawn in

correct proportion to a scale of ten feet to the inch. The battlemented verandah and conservatory, the bay-windows, and the finials, give it a pleasing appearance to lovers of the unique. Hammer-dressed stone would be the most appropriate, but an expensive material for the outside walls.

PLATE XXVII. exhibits the floor plans. The house will accommodate a family of six or eight persons. It is large and roomy, giving ample space for a family of this size, and might comfortably receive a larger one.

Plate XXVIII. consists of details. Fig. 1, verandah cornice and posts. Fig. 2, enlarged section of the verandah cornice. Fig. 3, section of the cornice of the building. Fig. 4, finial. Fig. 5, front-door. Fig. 6, chimney-can. Fig. 7, horizontal section of the bay-windows. Fig. 8, section of the sill of the bay-windows.

We give no specification for this design, but annex a general description, which occupies less room, and is sufficient for all practical purposes. Many things will be mentioned which do not belong essentially to the design, but which must be stated, in order that the building may be clearly understood, and an estimate of its cost correctly made.

The front is forty-four feet, and the side thirty-six feet in extent. Beside the two stories there are attic rooms, and a cellar, which is eight feet deep below the first floor. The trenches for the walls and piers in the cellar must be at least six inches deep, and those for the foundation of the verandah and conservatory two feet six inches deep.

The walls in the cellar, up to the joists of the first floor, and the foundation walls of the conservatory and verandah, are all of good quarry building stone, well laid in the best mortar. All other walls are of brick. Those of the first story are thirteen inches thick, and those of the second nine inches, both with a hollow space in the centre, two inches wide, and bonded at every seventh course by alternate headers. All flues are of brick, and overdrawn where necessary, to the peak of the roof. The mortar for all the work is to be composed of the best fresh lime and clean river sand.

The joists of the first story are three by twelve inch spruce, those of the second three by eleven inches, and those of the attic three by ten inches; the two last are hemlock, and all are placed sixteen inches between centres, backed and herring-bone bridged. The rafters are three by five inches, and placed two feet between centres. The studs for partitions are all three by four inches, except those next the doors, which are three by six inches. The inner floors are all of Carolina heart pine, one inch thick. That of the verandah is of white pine boards, one inch and a quarter thick, four inches wide, tongued and grooved, and laid with white lead in the joints. There are four twin windows in the rear, corresponding to the front bay-windows. The others are single. All are to have panneled inside shutters. The sash are diamond, one inch and three quarters thick, and hung as casements. The front doors are two inches thick. All room doors are one inch and three quarters thick, and double-faced. The closet doors are one inch and a quarter thick, and single-faced. The washboard of the hall, parlor and dining room, is eight inches wide, with a sub and moulding. All others are but six inches. The window and door dressings are heavy, with handsome mouldings. The stairs are of heart pine, on three strong carriages, with a mahogany newel and rail, and turned maple balusters.

All plastering is executed in the best manner, with handsome cornices and centre flowers in the parlor, hall and dining room. All the exterior walls are rough-cast, tinted and laid off in blocks. All wood work is to receive three coats of the best paint. The glass of the first story and second story front is the best American crown, the rest may be inferior. The roof is of slate. The gutters, vallies, flats, flushings, verandah and bay-window roofs, are of the best one cross leaded tin, painted on both sides, the upper side receiving two coats. The hot-air flues are of the best two cross tin.

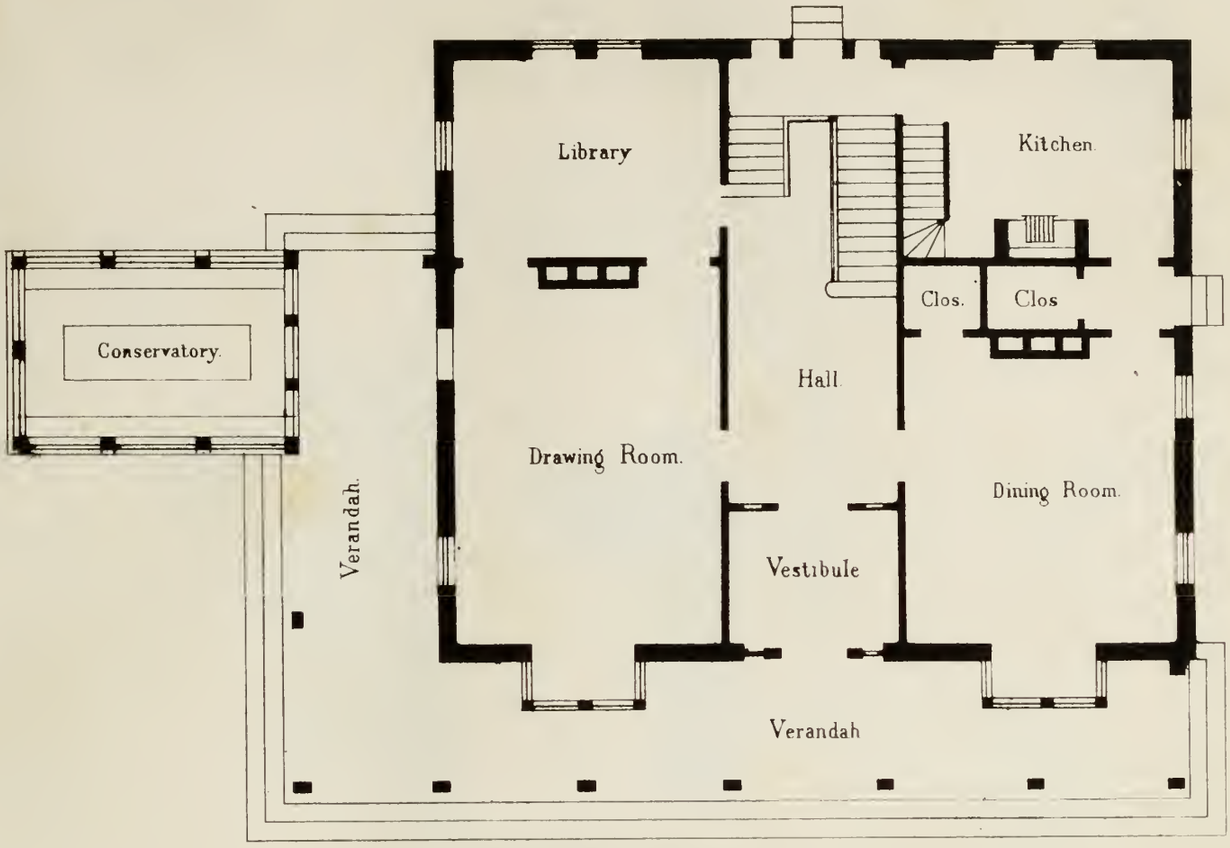
The cost of this building as described, will be $6250.00. If stone at a dollar a perch be substituted, it will be $6000.00. If the conservatory be omitted it will reduce this about $500.00.

Sam[l] Sloan Arch[t] P.S. Duval's Steam lith Press Philad[a]

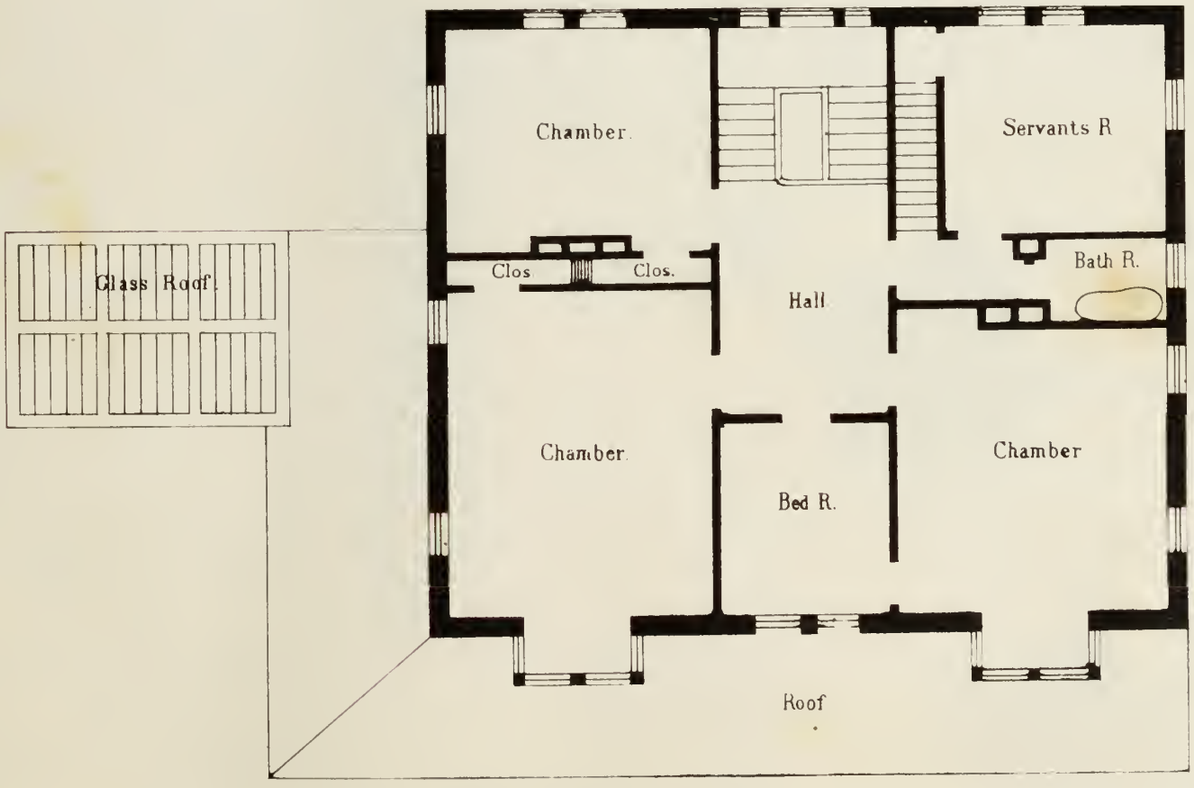
PERSPECTIVE VIEW.

Sam[l] Sloan Arch[t] P.S. Duval's Steam lith Press Phil[a]

ELIZABETHAN VILLA.



FIRST STORY.



SECOND STORY.

Scale 10 Ft to the inch.

P. S. Duval's Steam lith. Press Philad.ª

GROUND PLANS.

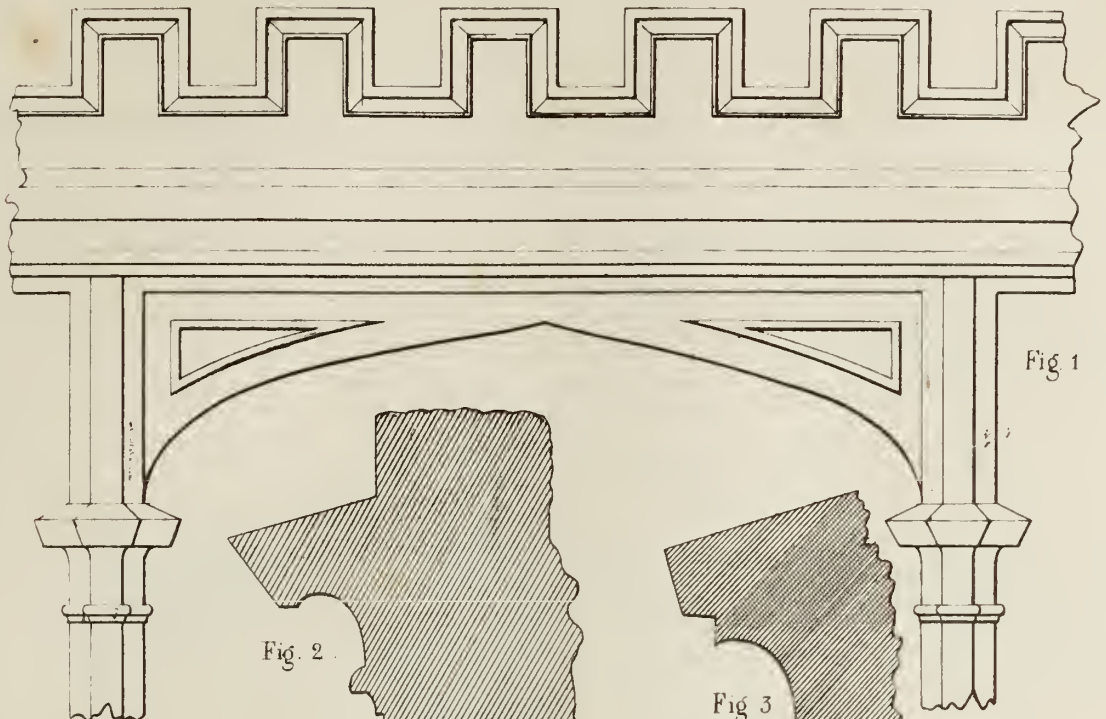


Fig. 1

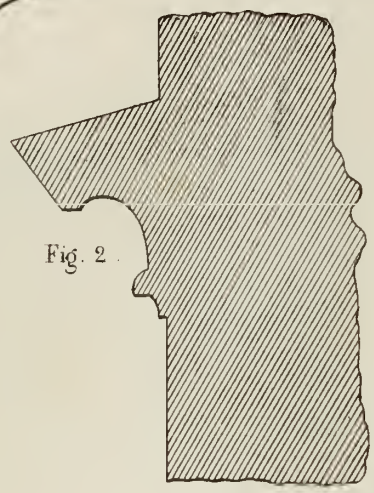


Fig. 2

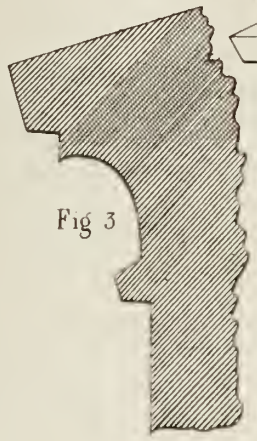


Fig 3

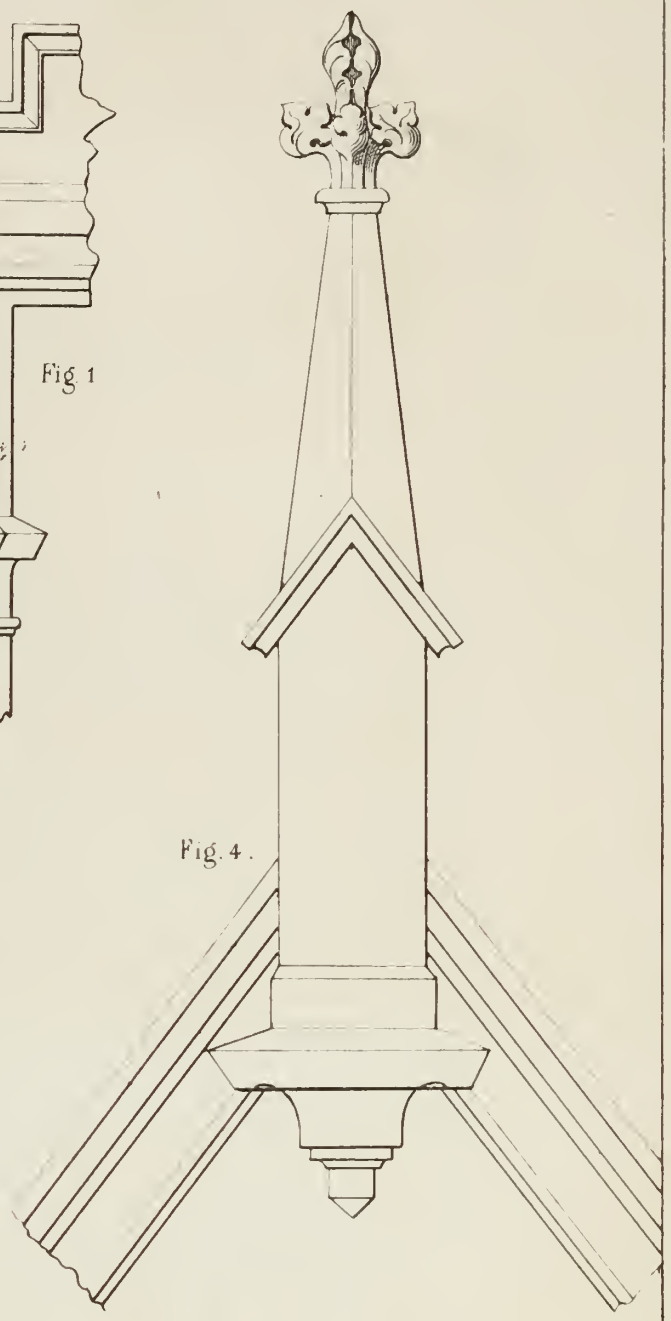


Fig. 4.

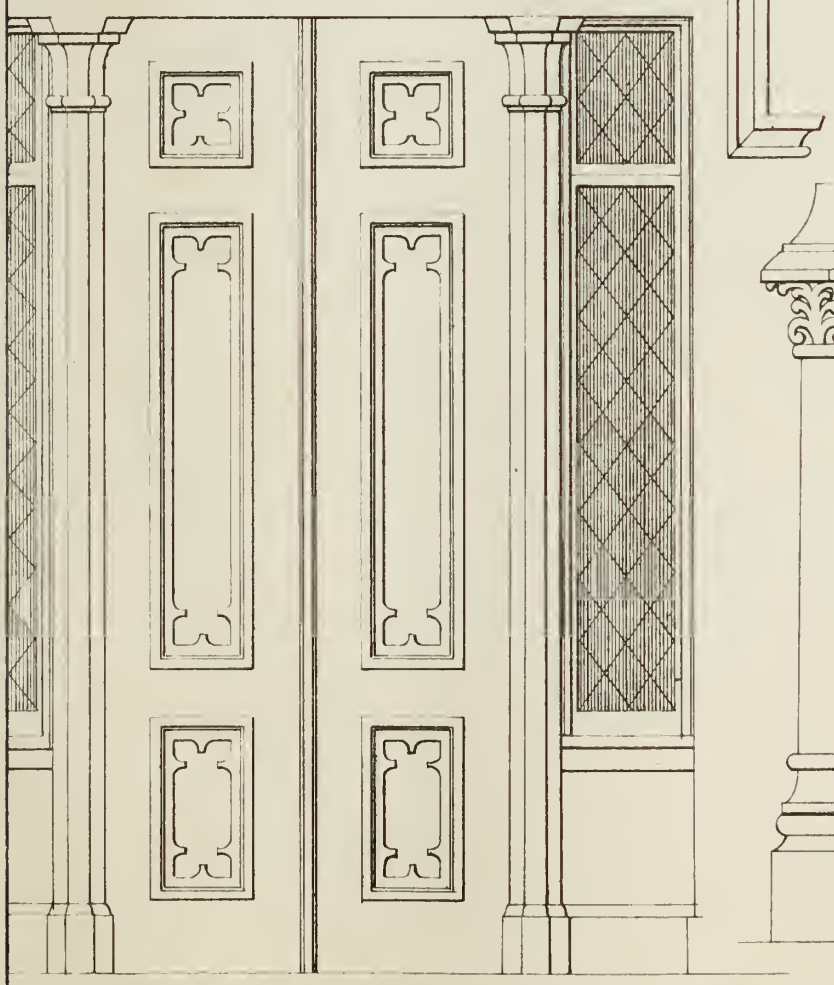


Fig. 5.

Fig 6.

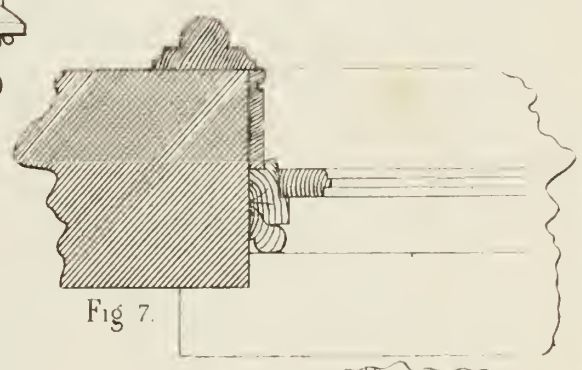


Fig 7.

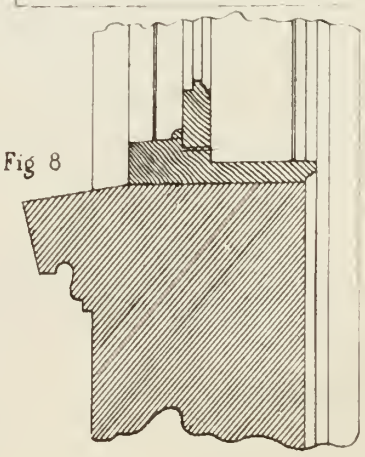


Fig 8

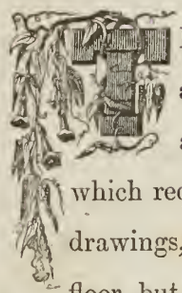
Scale to Sections,
One inch to the foot

Scale ½ inch to the foot.

P. S. Duval's Steam Lith. Press Philad.ª

DETAILS.

ARCHITECTURAL DRAWINGS.



HE number of drawings which are required by the builder varies of course with the extent and finish of the building. For the most simple houses two are sufficient, a Ground Plan and Elevation. For very elaborate buildings many more of different kinds are necessary, which require great labor and skill in their execution. Of these, which are usually called working drawings, the Ground Plans properly come first. They consist of the plans not only of the ground floor, but of the different stories, attic and cellar, and would therefore more properly be called floor plans, though the other term has been sanctioned by custom. Only such are drawn as in the case may be necessary. They exhibit the situation of the walls and partitions, and the relative positions of the doors, windows, flues, stairs, porches, &c. The whole being drawn in accurate proportion to a scale, usually laid down on the drawing for convenient reference, the exact dimensions of each part are ascertained by applying the compasses. We sometimes see introduced into architectural works Isometric drawings. These suppose the subject to be viewed from above, and are drawn in perspective. A horizontal section of a building, made just above the window sills is occasionally exhibited in this way, but is of very little practical value, since measurements cannot be taken from it, and only serves to inform the unpractised eye.

The next drawings are those of the Elevations. One is sometimes sufficient, but often four have to be made, one of each front of the building. These elevations are drawn in what is called geometric projection. Each point of the front drawn is supposed to be projected perpendicularly upon a vertical plane situated immediately behind it; or, in other words, the front is supposed to be viewed from an infinite distance in which all the lines of sight are parallel. The variations caused by the light and shade are retained, and serve to show the irregularities of the surface. These drawings are also made to a scale, and accurate measurements may be taken from them. The general effect, however, is very different from that which exists in nature. Two objects are often exhibited on the same elevation, which cannot really be seen from the same point of view, and the more irregular the design the greater is the deviation from the true appearance. The object in elevation drawings is not so much to present a view of the building as to furnish the workman with a chart from which to take dimensions and ascertain the relative position of parts. An elevation of a vertical section of the building is sometimes drawn, and is valuable for exhibiting constructive features and internal arrangements.

The general appearance of the building is sometimes exhibited in a Perspective view. This drawing is the most difficult in execution, it depending on more complicate geometrical rules than the others. It

represents the building exactly as it appears in nature from a given point of view, and is drawn more for the information of the projector than the use of the workman, since it affords no measurements whatever.

Other drawings are generally the details of different parts of the building. These are on a large scale, showing the manner of construction and minute ornaments which cannot be exhibited upon the general drawings; such as the framing of floors, partitions and roofs, for the carpenter; sections of door and window frames and mouldings, for the joiner; the patterns of the various iron work, for the founder; decorative details of columns, entablatures, cornices, flowers, leaves, scrolls, brackets, finials, &c., for the carver. These drawings are either sections or geometrical projections. They are more numerous than any other, and are in constant requisition from the commencement until the completion of the work.

As has been said, a correct and finished execution of these working drawings is a matter of no small difficulty. A good draughtsman, in addition to a correct eye and the readiness attained only by practice, must be thoroughly versed in the principles of geometric projection, perspective, and chiaseuro, or light and shade, without which he will work at random and his drawings will be incomprehensible. No one except the experienced can conceive how great a change may sometimes be wrought in a drawing by a single line or a simple shadow. The greatest care is requisite that there may be no falsity. The engraved drawings in this work illustrate these remarks. No pains are spared to make them correct, and that a complete set may accompany each design.

AN ITALIAN RESIDENCE.

DESIGN EIGHTH.

This is a genuine Italian building. Its high finish gives it the eharaeter of a suburban rather than a eountry dwelling, and indeed throughout it is mueh more elaborate than any preceding design. It is without the frequent eampanile, whose place is somewhat supplied by the front pediment. The simplieity of the outlines is relieved by the ornamental details.

The front elevation is exhibited on Plate XXIX. We will here make a reference to a remark in the preceding artiele. It may be observed that the roof of the building in this elevation is entirely visible, which takes away somewhat from the graceful appearance of the façade, by making the wings appear too near the eaves of the body of the building. This, were the real building before us, would not appear. An observer would have to be at a considerable distanee to see the roof at all. Thus the remark is illustrated that an elevation drawing may give a very false idea of the real building, and therefore cannot be taken as a criterion in every respect, but simply as a chart for the workman. This elevation is drawn to a seale of ten feet to the ineh.

One elevation only of this design is given. That of the right wing would display a window on the side of the main entranee hall, with two immediately above it in the second and third stories. Also four single windows in the end of the

wing; the two beneath the verandah reaching the floor. The octagonal projection of the body of the building in the rear would come into view with its windows, and roof hipped somewhat in the manner of the front in Design First, only much more flat. The dressings of this elevation are more plain than those of the front.

Plate XXXI. of the ground plans exhibits the octagonal projection mentioned. A verandah encircling this would be a pleasant appendage. The entrance hall in the first story might be enlarged by continuing the wall, which separates the kitchen and stairs, across the end of the dining room. This would make the entrance more free to the parlor from the hall, and make the stairway more open and airy, besides bringing the partition immediately below the one in the second story. The alteration, however, would diminish the size of the dining room, and alter its shape.

It would probably be quite as convenient to use the Dining Room as a sitting room, the Kitchen as a dining room and the Wash-House as the kitchen. The end of the hall beneath the turn of the stairs might be partitioned off, and with the window and a door opening into the kitchen, would form an excellent pantry. The door of the wash-house would perhaps be more convenient in the rear. In the second story the size of the closet over the stairs might be diminished so as to avoid the blank window, and thus give additional light in the passage. The plan of the third story corresponds exactly to that of the second story main building. This house is evidently very roomy. A family of ten would by no means find it too small. If the servants be included in this number there will be apartments for a library and spare chamber.

Plate XXXII. consists of Details. Fig. 1 shows the cornice and brackets of the wings. Fig. 2, section of the cornice and wall. Fig. 3, part of the front pediment. Fig. 4, section of the same. Fig. 5, front door. Fig. 6, crowning ornament of the pediment. Fig. 7, front porch. Fig. 8, section of the same. Fig. 9, chimney-can.

Plate XXXIII. is also of Details. Fig. 1 is the third story balcony. Fig. 2, section of the same, showing the bracket. Fig. 3, second story windows. Fig. 4, first story windows. Fig. 5, section of the same, showing the bracket. Fig. 6, newel and baluster of the stairs. Figs. 7 and 8, sections of the window frames.

The entire front of the building, including the verandah and wash-house, is sixty-six feet. The depth, measuring through the Dining Room and the porch, is forty-two feet six inches. The divisions and their dimensions are all figured on the floor plans. The first story is thirteen feet four inches high to the top of the second floor. The second story is twelve feet to the top of the third floor in the main building, and the third story is ten feet in the clear. The cellar throughout the entire extent of the main building and wings, is eight feet deep in the clear, and the trenches for foundations are at least eight inches below the cellar floor, the earth therefrom being graded around the building as may be requisite to embellish the grounds.

The walls of the cellar, as high as the joists of the first floor and the foundations of the verandah and wash-house, are all of quarry building stone; that of the foundations is large and flat, solidly bedded in the mortar. The facings are all smoothly dashed, and afterwards whitewashed. The mortar for this masonry is composed of good coarse sharp sand and fresh wood-burnt lime. The outside walls of the superstructure are composed of bricks, and are thirteen inches thick; no soft brick being placed within four inches of the exterior surface of the walls. The inner walls of the main building are nine inches thick. All other divisions are stud partitions. The front corners of the main building have each a pilaster projecting four inches from the wall. The flues are located as exhibited on the plate of plans. They are well pargetted and surmounted with the chimney-can exhibited on the plate of details. A case of brick is built in the cellar for a furnace. All this brick-work is done with good firm mortar. The bricks of the exterior are three eighths of an inch distant from each other, and the mortar removed from between them at least half an inch deep.

The joists of the first floor are three by eleven inches, and of spruce pine throughout. Those of the second and third stories are of the same dimensions, of hemlock. Those of the second story wings are three by ten, and also of hemlock. All are placed sixteen inches between centres, and have a course of bridging through the middle of each room. The studs for partitions are three by four inches, and are also placed sixteen inches between centres. The rafters are three by five inches, and placed two feet between centres; they are sheathed with quartered and well seasoned boards, for a metal covering.

The floors are all of one inch Carolina heart pine, well worked and well seasoned. The stairs are put up on three carriages, with one inch and a quarter heart step boards, having one and three quarter inch balusters, a newel and moulded rail, all of mahogany. The newel, balusters and brackets are richly carved as on the plate of details. Other stairs are in the usual style; those to the cellar are under the main stairs, or may lead from the wash-house.

The windows of the front correspond with the elevation. Those of the first story are enriched with terra-cotta brackets and head-piece. Those of the second and third stories all are arched and have a finish like to those on the front. The windows of the first story sides and rear, and those of the verandah reaching the floor, have square heads, but are more plainly dressed than the front. They are twin or single, as delineated on the ground plans. The sash are all double, hung with axle pullies and patent cord, and all of the first and second stories have inside double shutters, one inch thick, in two folds of two panels each, with fillets and mouldings. All glass is the best American, well bedded and back-puttied.

The doors on the front are two inches thick, with fillets and mouldings on one side and bead and butt on the other. The side lights have inside shutters. The dressings correspond with the plate. All the room doors in the first and second stories are one inch and three quarters thick, with moulding and fillets. Those in the third story, and all closet doors, are one inch and a quarter thick, with moulding and fillets on one side. All the one and three quarter inch doors are hung with four by four inch butts and secured with four inch mortice locks. The front doors have an eight inch upright mortice lock, and are further secured with bolts. The closet doors also have locks. The knobs of the first and second stories are all of porcelain.

The front porch, verandah and balconies are all partly exhibited on the plates of details. The floors are of one inch and a quarter white pine, quartered and grooved, the joints being well coated with white lead. The whole of the wood-work, inside and out, has three coats of pure white-lead paint, that of the exterior having an additional coat, tinted and sanded so as to represent stone.

The walls and ceilings throughout have two coats of brown mortar and one of white hard finish. The Parlor, Dining Room and Hall have each a moulded cornice girting twelve inches, with a centre flower in the Parlor three feet six inches in diameter, one in the Dining Room three feet, and one in the Hall two feet six inches. The exterior is all to be rough-cast in the very best manner, tinted and laid off in blocks.

The roofs of the building and its appendages, all having concealed gutters, are overlaid with the best one cross leaded tin, well painted on both sides, the upper side receiving two coats. This tin is drawn over slats laid from the apex of the roof to the eaves, two feet between centres, as exhibited on the elevation. There are four three inch conductors necessary to convey the water from the roof.

All the materials used in the above work are of the very best quality, and in all respects not herein described the work is executed in the best style.

The cost of this building, according to the present rates of material and workmanship, would be about $5,200.

Design VIII. *Pl XXIX.*

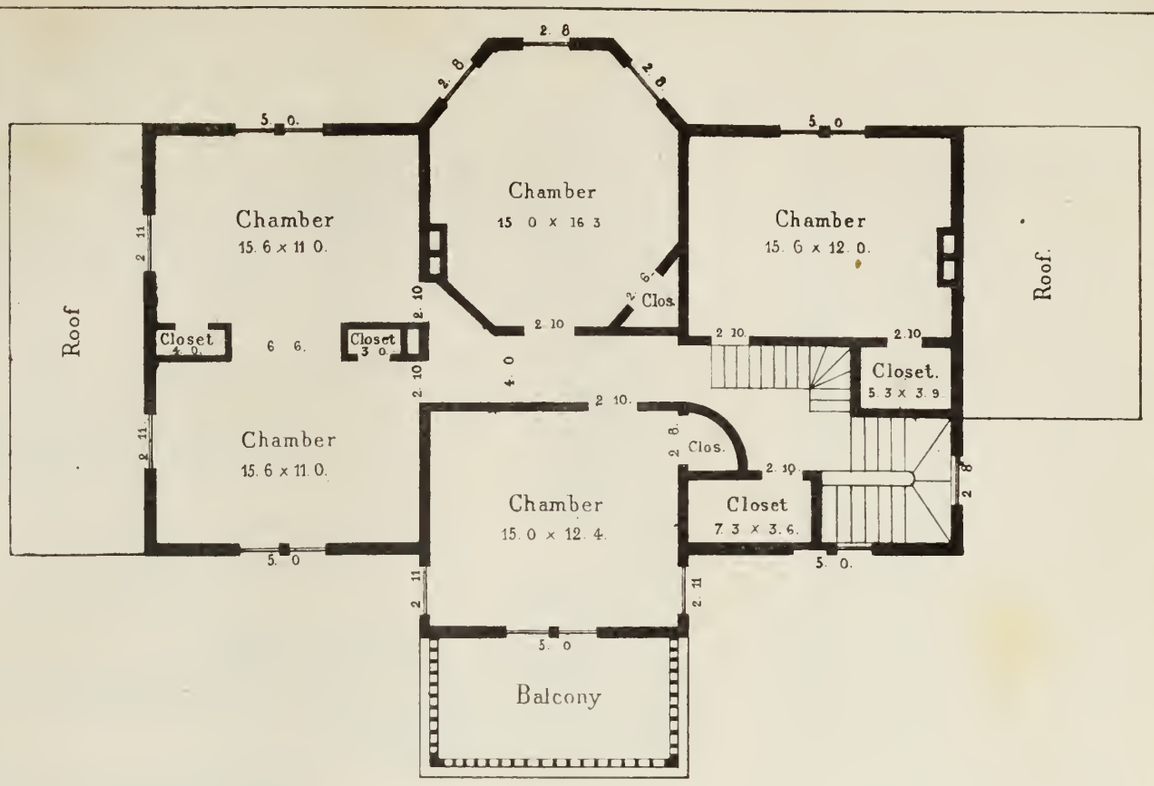
Sam[l] Sloan Arch[t] P.S. Duval & Co's Steam lith. Press Philad[a]

ITALIAN RESIDENCE.

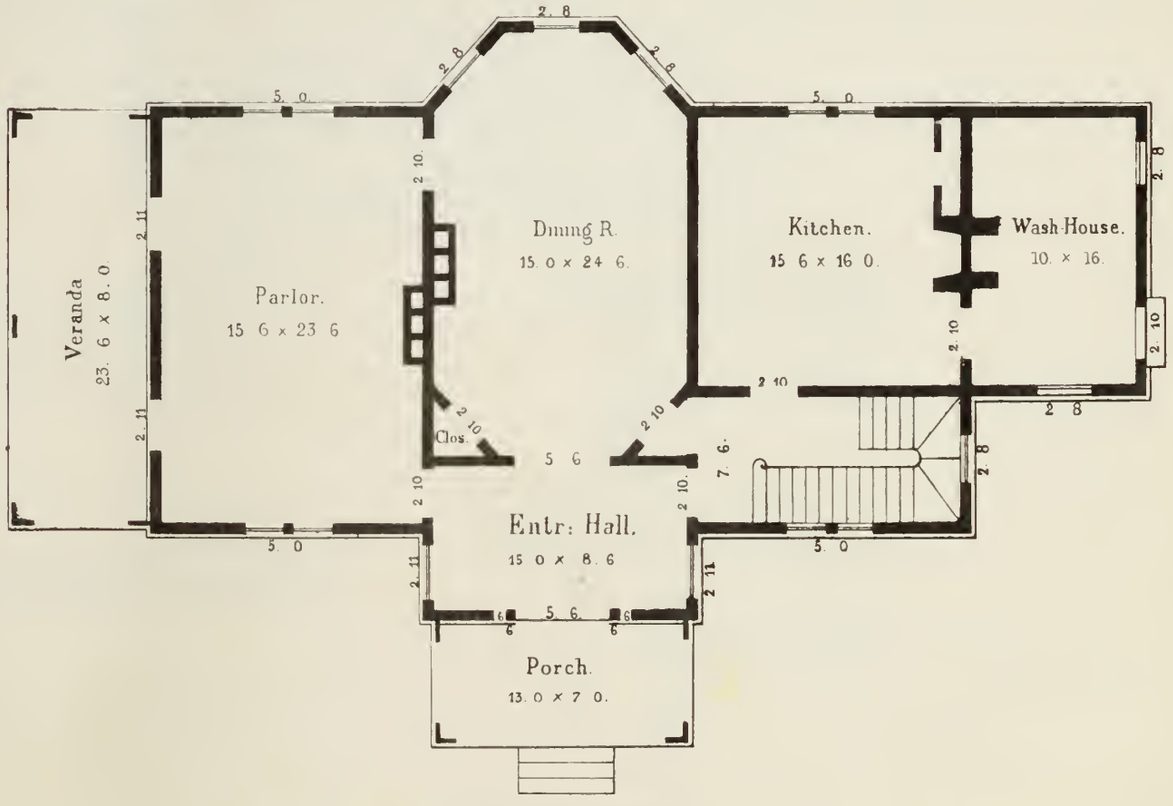
Design IX. *Pl. XXX.*

Sam[l] Sloan Arch[t] P. S. Duval & Co's Steam lith. Press Philad[a]

ORNAMENTAL VILLA.



SECOND STORY.



FIRST STORY.

Scale 10 ft to the inch.

GROUND PLANS.

P. S. Duval's Steam lith. Press Philad.ª

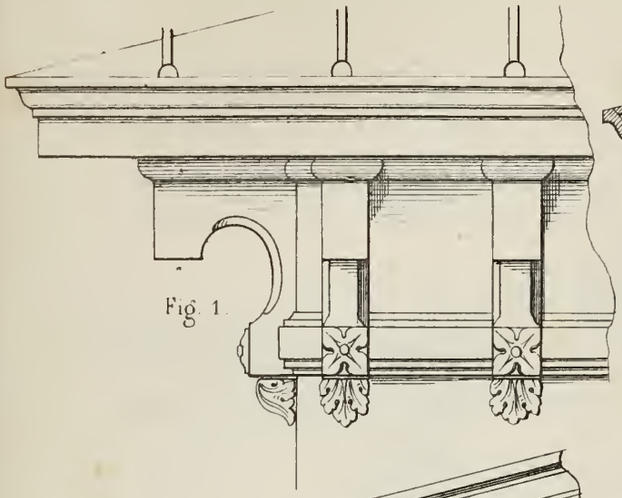


Fig. 1.

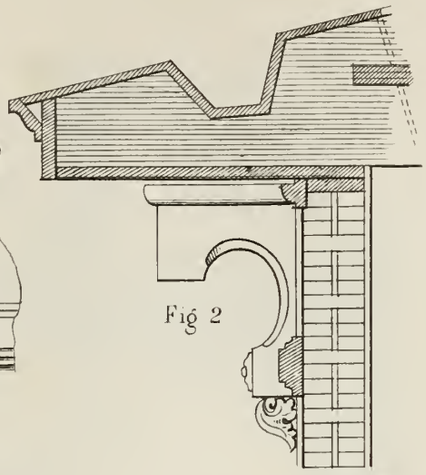


Fig 2

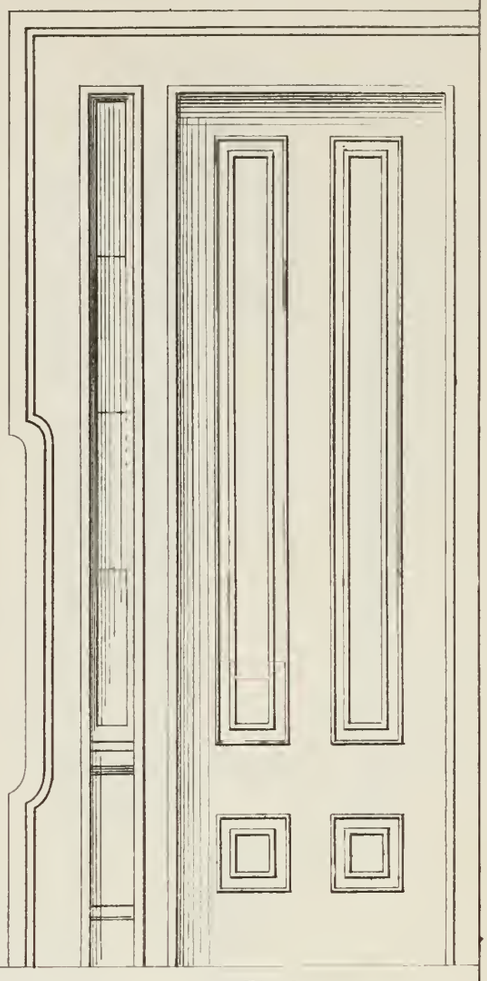


Fig. 5.

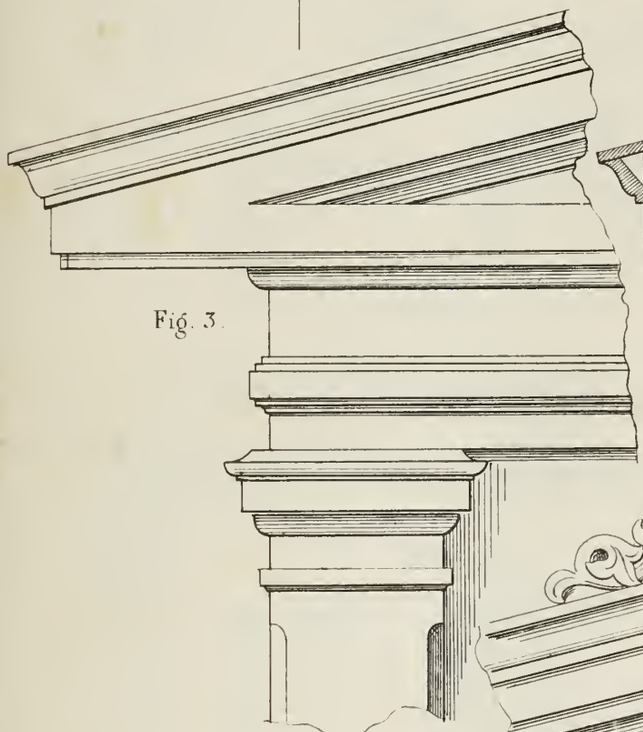
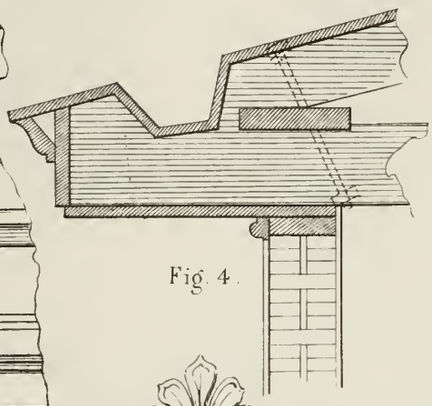


Fig. 3.



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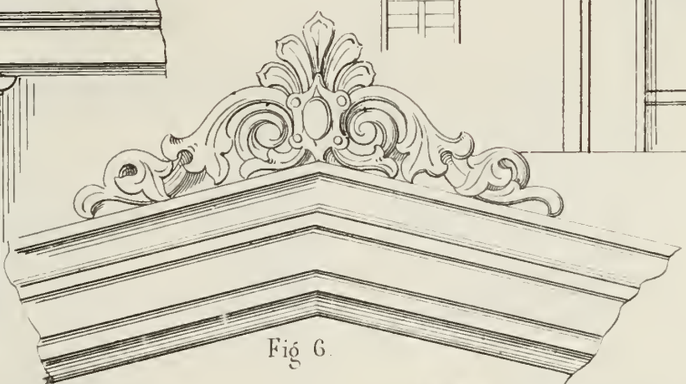

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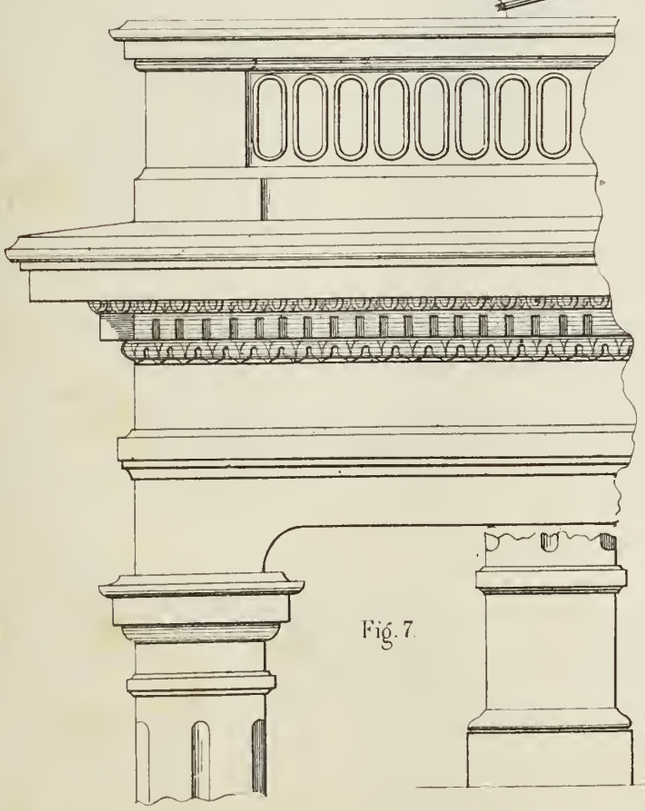

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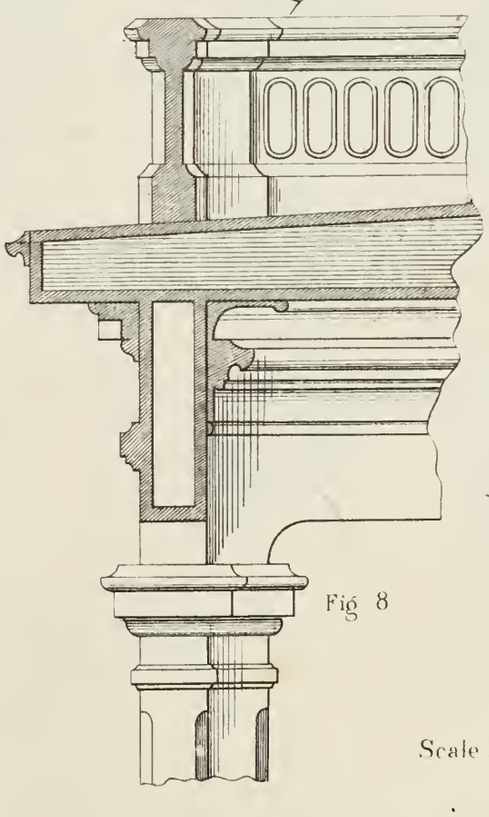

Fig 8

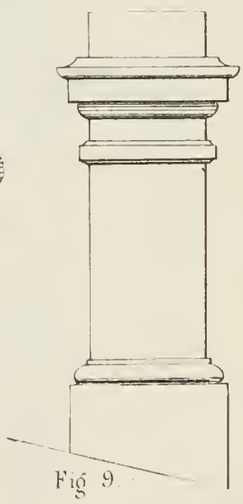

Fig 9.

Scale ½ inch to the foot

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DETAILS.

Fig. 1

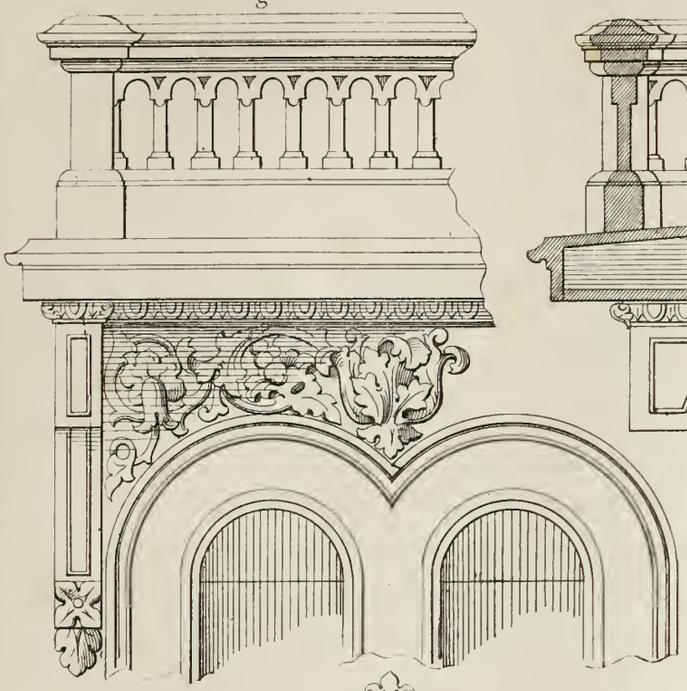


Fig 2

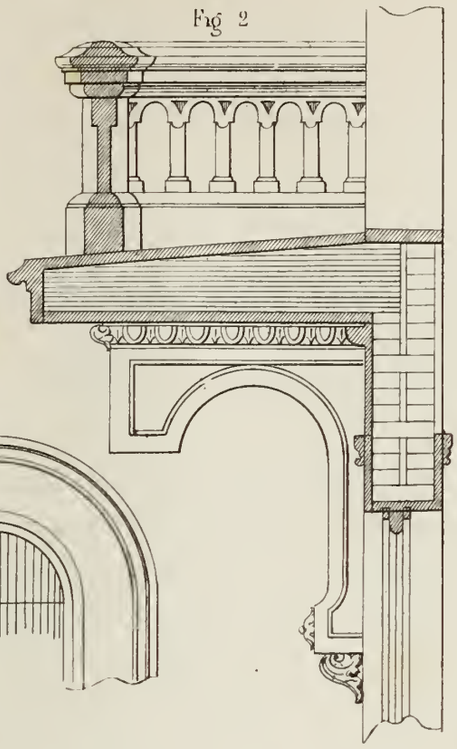
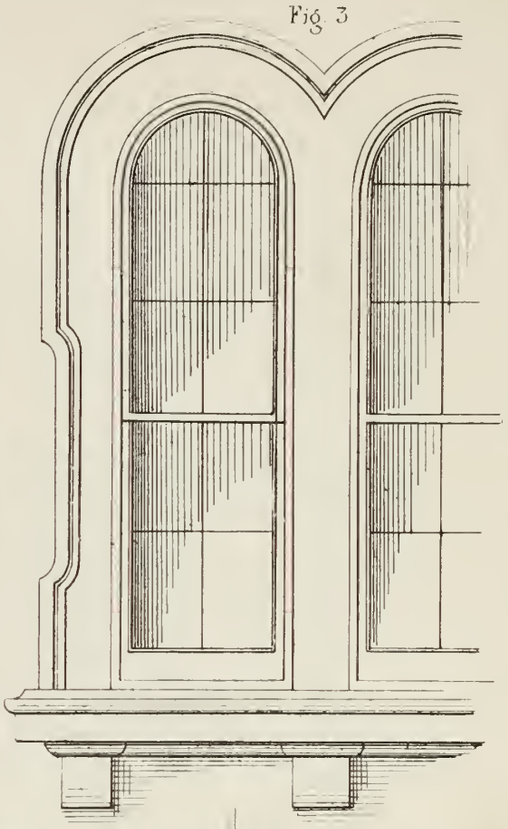


Fig. 3



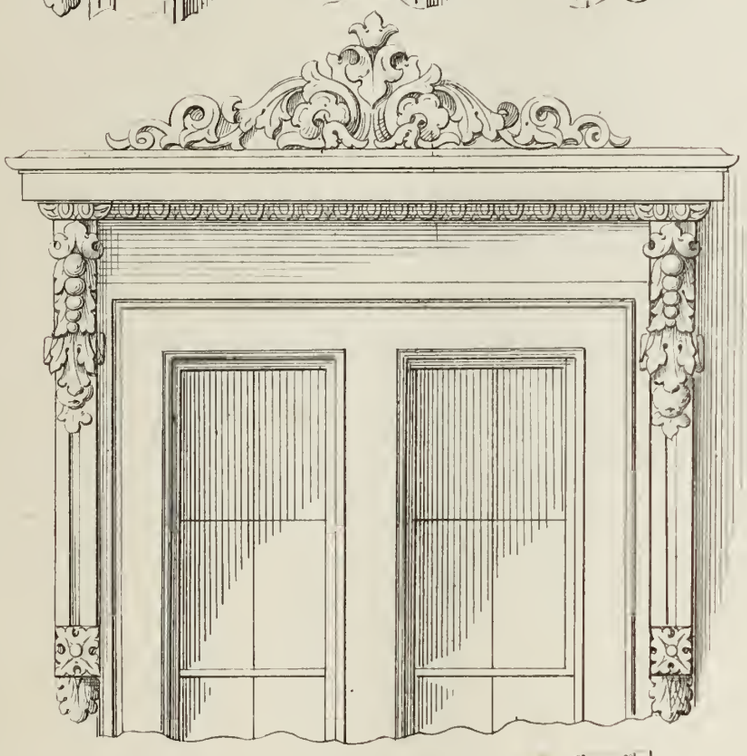
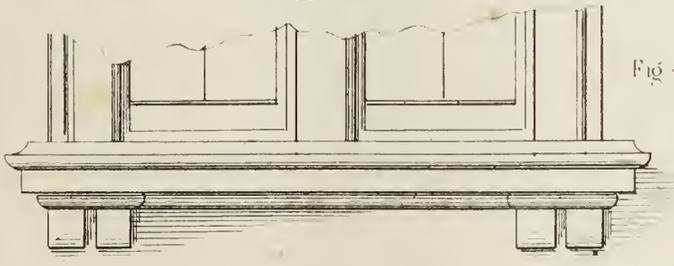


Fig 4



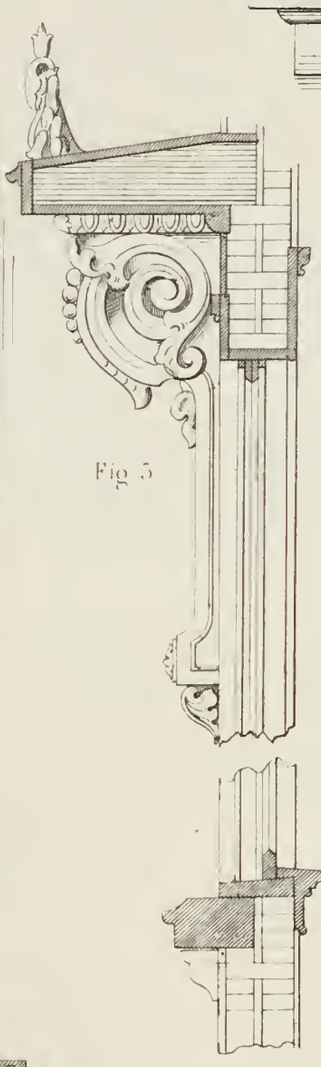


Fig 5

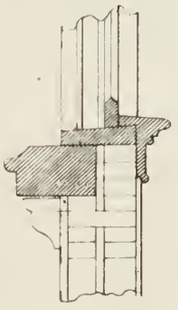
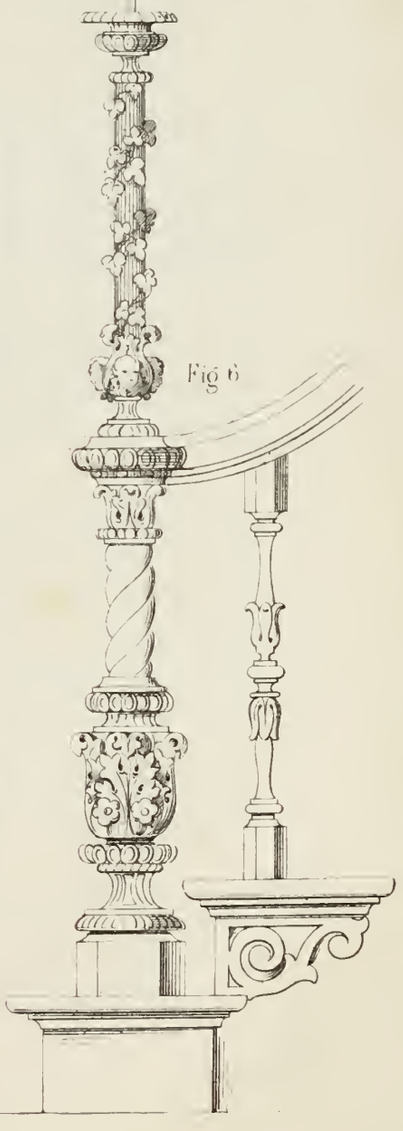


Fig 6



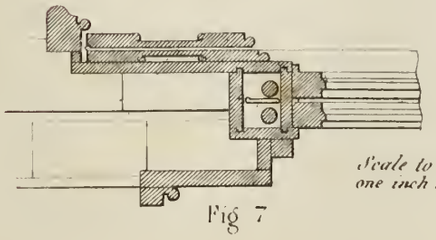


Fig 7

Scale to Figs. 7 & 8 one inch to the foot

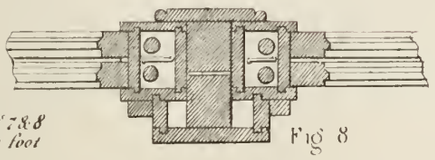


Fig 8

Scale. 1/2 inch to the foot

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DETAILS.

AN ORNAMENTAL VILLA.

DESIGN NINTH.

We present on Plate XXX. the perspective view of an Ornamental Villa. The enriched appearance of this design is due almost entirely to the balconies, brackets and other ornaments about the eaves. The style of these is Swiss, and it therefore might be named, a villa ornamented in the Swiss style. It has long been acknowledged that there is nothing more beautifully picturesque than this kind of decoration, when well arranged. It has an elegant and highly finished, though it may be a somewhat meretricious effect. The building is evidently not a rural cottage, nor would it do for a farm house; nevertheless a retired situation best accords with its expression. This indeed is characteristic of the Swiss style, or any thing approaching thereto, that it is best adapted to a wild and mountainous, or at least a hilly locality. A high position, affording a view of the building from the distant landscape, is always desirable.

There is one great objection to it, however. The ornamental appendages are expensive. But it is to be hoped that the time is, or is coming, when such near-sighted utilitarianism will give way to more liberal views of life, and that he who builds for himself a home, will aim beyond mere physical comfort.

Plate XXXIV. presents an elevation of the side which is partially exhibited in the perspective view. On this we have the conservatory displayed, which is the chief ornamental feature of the elevation. It has above a large balcony, approached from the second story. The roof in both elevations is so arranged as to destroy a monotonous effect, but its real appearance must not be judged the same as that here presented. As there is a cellar beneath the building, square windows, barred, might be introduced beneath the lower balconies, to give light and air.

Plate XXXV. is the Front Elevation. It is well to observe that the brackets of the balconies, those under the porch and the very projecting eaves, are all of various patterns suited to their positions. Those of the eaves are clustered against each pilaster. The side porch appears only on this elevation, but is of simple design. Both of the elevations are drawn to a scale of twelve feet to the inch.

On Plate XXXVI. are the Ground Plans. This house, as a glance makes evident, is large, but not designed for a large family. It would accommodate six or seven persons readily, yet, planned as it is for luxurious livers, it would be none too large for only four or five. The Hall receives its light principally from the cupola above. The flues are arranged either for grates or for a furnace in the cellar. A ventilating flue from the water closets might be encased in the wall. The side porch may be extended to any desirable length, and an outside cellar door made beneath it. All the divisions of the first story, and those corresponding in the second, are of brick.

Plate XXXVII. is of Details. Fig. 1 is the front porch, balcony and window above. Fig. 2, section of the porch cornice. Fig. 3, front balconies and windows of the wings. Fig. 4, section of the upper balcony in fig. 3, showing the bracket. Fig. 5, section of the lower balcony in fig. 3, showing the bracket.

Plate XXXVIII., also of Details, shows, in Fig. 1, the crowning and other ornaments of the front gable. Fig. 2, section of the same, showing the gable bracket. Fig. 3, bracket of the eaves. Fig. 4, cupola. Fig. 5, section of the same, showing the exterior and interior brackets. Fig. 6, chimney-can. Fig. 7, cornice, &c., of the conservatory.

SPECIFICATION

Of the workmanship and materials to be employed in the erection of Design Ninth.

EXCAVATION.—The cellar is to extend beneath the entire building, and be nine feet deep from the level of the principal floor. Dig all the trenches for the foundations at least ten inches below the cellar floor, and deeper if necessary to secure a good foundation. Cut away and fill up with earth around the building to the intended line of ground level, ramming the same quite hard, and provide for all necessary drains, cess-pools, dwarf-walls or other such work required by the plans, or directed by the architect.

MASONRY.—Construct the lower walls of stone as follows,—nine feet ten inches in height and twenty-two inches thick, the foundations of the divisions eighteen inches thick and ten inches in height, and compose all of the best material, as hereinafter set forth. Flush the whole in mortar of the best approved compound of sharp sand and well burnt lime. If the material be of an absorbent quality the whole must be grouted every two feet.

BRICK-WORK.—All the exterior walls, from the level of the first floor to the roof, are to be constructed of well burnt and approved brick, and are to be fourteen and a half inches thick, with a hollow space in the centre one inch and a quarter broad, the inner course being four inches and one fourth thick, and those without being eight inches and a half thick. The division walls in the cellar, as high as the first floor, must also be of sound and well constructed brick-work, thirteen inches thick, corresponding in position to the divisions in the plan of the first story. All openings in these walls are to be arched. The principal divisions of the first and second stories, corresponding with the plans, are to be of brick-work nine inches thick. All flues, for thoroughly warming and ventilating the building, are to be placed as on the plans and as may be directed during the progress of the work. Those for gas must in no case be less than nine by thirteen inches, and be so arranged that stove pipes can be passed into them from each of the principal rooms. They are to be pargetted and surmounted with a chimney-can. This brick-work must be done with mortar compounded of the best clean river sand and well burnt lime. The mortar is to be removed from between the exterior bricks to the depth of half an inch.

CARPENTER-WORK.—Place all joists, studs and rafters sixteen inches between centres. The joists of the first floor are to be three by eleven inch spruce pine. Those of the second floor are to be of hemlock, three by twelve inches. A course of herring-bone bridging is to run through the middle of each tier. The ceiling joists are to be two by ten inches and also bridged. The rafters are to be three by six inches. The wall plates at the eaves and on the gables are to be three by nine inches. The ridge piece is to be three by twelve inches, and the whole roof must be framed according to working drawings, to be provided for the purpose, and furnished with all bolts, straps, spikes, lathing and other material necessary to finish and prepare the same for the slater.

FLOORS.—The floors throughout the interior are to be of the best Carolina heart pine boards, one inch thick, and not over four inches wide when tongued and grooved. They must be well seasoned, well worked, firmly nailed to the joists and afterwards smoothed off. The floors of the balconies and porches are to be of white pine board, two inches and a half wide, tongued and grooved and with white lead in all the joints. The underside of all the balconies must be ceiled with sound half inch planed and grooved boards.

STAIRS.—Place all stairs on three strong carriages and make the steps of one inch and a quarter heart boards. The risers must be of pine one inch thick, grooved and glued to the steps. The newel of the main flight is to be eight inches in diameter and richly carved. The balusters must be turned and not less than two and a quarter inches in diameter. The rail is to be moulded, and in size two and a quarter by four and a half inches. The rail and balusters of the gallery are to be like to those of the main stairway, all being of the best mahogany. The newel of the private stairs is to be six inches in diameter, and the balusters one inch and three quarters turned. The rail must be moulded and be two by three and three quarter inches.

DRESSINGS.—The brackets for the projecting eaves, gables, balconies, &c., are to be constructed in accordance with the form shown on the plates of details, and must be well secured to the soffits of the roof, &c., with spikes, and also to the walls before rough-casting. The cupola, face of the eaves, verge board, dressings of the gables, balconies, porches, conservatory and window dressings, must all be constructed as set forth on the plates of details. The wash-boards throughout the principal rooms of the first and second stories, vestibule, lobbies, halls and gallery, must be one inch and a quarter thick with a one and three quarter by four inch sub, and a moulding on top two inches and a quarter high, the whole, including the sub and moulding, being fourteen inches broad. All other wash-boards are to be eight inches broad, with a moulding on top. The inside dressings of the windows and doors must be of high finish, as may be directed.

DOORS.—All the principal doors in the first story must be two inches thick, with eight inch stiles and bottom rail fourteen inches wide. The panels are to have rich mouldings on both sides, with carved flowers in the centre of each. The kitchen, conservatory, store room and closet doors are to be one inch and three quarters thick, with plain mouldings two inches and a quarter wide. The principal room doors in the second story must be one inch and three quarters thick, with seven-inch stiles and bottom rails twelve inches wide. They are to have two and a half inch mouldings on both sides. The doors of the bath room and closets are to be one inch and a half thick, with mouldings on one side.

WINDOWS.—The windows are to correspond with the elevation and detail plates. The sash in the first story are to be one inch and three quarters thick, and those of the second story are to be one inch and a half thick. Each window is to have inside shutters, panelled and one inch thick, with four folds to each jamb. The inside dressings of all the doors and windows are to correspond with those of the exterior, except the head piece, which is to be more rich. The windows of the kitchen and minor apartments are to have four inch mouldings inside. Provide lintels eight inches deep over each opening in the wall, nine inches longer than the breadth of the opening beneath.

CLOSETS.—The closets throughout must be fully and neatly shelved, or have clothes hooks, as may be directed. Provide a dresser in the kitchen of most approved construction.

PLASTERING.—Lath all stud partitions and ceilings for plastering. Give all walls and ceilings throughout the interior of the building two coats of brown mortar and one of white hard finish. Place a centre flower in the parlor five feet in diameter, one in the dining room four feet in diameter, and one in the vestibule three feet and a half in diameter. The cornice in each of these rooms is to girt seventeen inches. There is to be a cornice in the lobby, hall, library and the two principal chambers, girting nine inches. Lath and plaster the external soffits of the projecting eaves and the ceilings of the porches, and tint the same as may be desired. The whole external brick-work is to be rough-cast in the very best manner, and hard finished for painting and sanding, by a workman familiar with the business.

SLATING.—The roof is to be overlaid with the best domestic slate, of small size, secured with oiled nails, two to each slate. This slating must be made tight to the house and pointed underneath with strong hair mortar, to exclude better the driving rain and snow.

TINNING.—The hip ridges, vallies, flushings and gutters, are to be laid with good leaded tin, prepared for the purpose. All the projecting window heads and porch roofs are to be covered with the same. Provide four tin conductors, extending from the gutters to the ground, with shoes, eave pipes, &c., all put up securely and painted. All hot air flues must be lined with two cross tin.

PLUMBING.—Place a reservoir in the loft over the bath room, lined with sheet lead three pounds to the foot, and supplied by a force pump. Provide and arrange all necessary lead pipes for conveying the water from the reservoir to the bath room, to the water closets, to the sink and range in the kitchen, and to wash-basins in the two principal chambers. The bath tub and sink are to be of enamelled iron, and to be supplied with additional pipes for warm water from a boiler in the kitchen. A hot and cold shower bath is to be placed over the tub. The stop-cocks in the chambers are to be silver plated. All others are to be bronzed. China bowls must be provided for the chambers and water closets. All pipes are to be five eighths of an inch, extra strong, and every thing must be furnished, put up and completed.

PAINTING, &c..—All tin-work on the roofs is to be painted on both sides, the upper side receiving two coats corresponding in color with the slate. Paint and sand the exterior walls in the best style. Paint all exterior wood-work with four coats, tinted and worked in imitation of old oak. Paint all interior wood-work with three coats of pure white-lead, mixed with the best linseed oil, all joints and holes having been puttied and the knots properly subdued. The newels, balusters and rails of the stairways and gallery are to have four coats of varnish. The sash are all to be glazed with the best American crown glass, well bedded, bradded and back puttied. The window over the stairway is to be stained glass of a selected pattern.

HARDWARE.—Provide four by five inch silver plated butt hinges for the doors of the lobby and vestibule. The front doors are to be furthermore furnished with an eight inch, upright, mortice, rebate lock, with a night key and porcelain furniture ornamented, the cost of the lock being not less than fourteen dollars. Provide the rest of the above doors with mortice locks having porcelain knobs, the cost of each not being less than six dollars and a half. The principal doors in the second story are to have four by four inch plated butt hinges, and locks with porcelain furniture, not costing less than five dollars each. All other doors must be hung with suitable butts and secured by locks with mineral knobs at three dollars each. All windows are to be double hung with axle pullies and patent cord. Provide one dozen double and one dozen single brass clothes hooks and place them in the bath room and closets as may be directed. Procure two and a half cwt. of iron anchors, bolts, &c., to be used in the framing of the floors and roofs where necessary. Place in the kitchen a bell connected with a porcelain pull in the front door, the cost of the whole complete not being less than five dollars and a half. Place six other bells in the kitchen, with pulls in the principal rooms, as may be directed. Place four mantles, of enamelled iron, in the four principal rooms, the cost of each not being less than thirty dollars.

DEAFENING.—The second story floor is to be deafened by placing cleats on the joists. These must be then floored over and filled with mortar flush to the edge of the joists.

TILES.—The vestibule, lobby and hall are to be paved with plain tiles, No. 25 pattern, buff and black. In the hall place an octagon centre piece, of encaustic tiles, three colors, covering twelve square feet.

FINALLY.—Complete the whole of the above work in the best and most workmanlike manner, according to the working drawings and the general intent and meaning of this specification, subject at all times to the direction and decision of the owner or his superintendent.

A FULL ESTIMATE

OF THE COST IN ERECTING DESIGN NINTH.

This estimate is intended to comprise nearly all the minutiæ of the building, each thing being of the very best quality and set at the market cash price for the same. It will be perceived that the amount is greatly increased by expensive decorations, which, if desirable, could be omitted or reduced, and thus considerably diminish the cost.

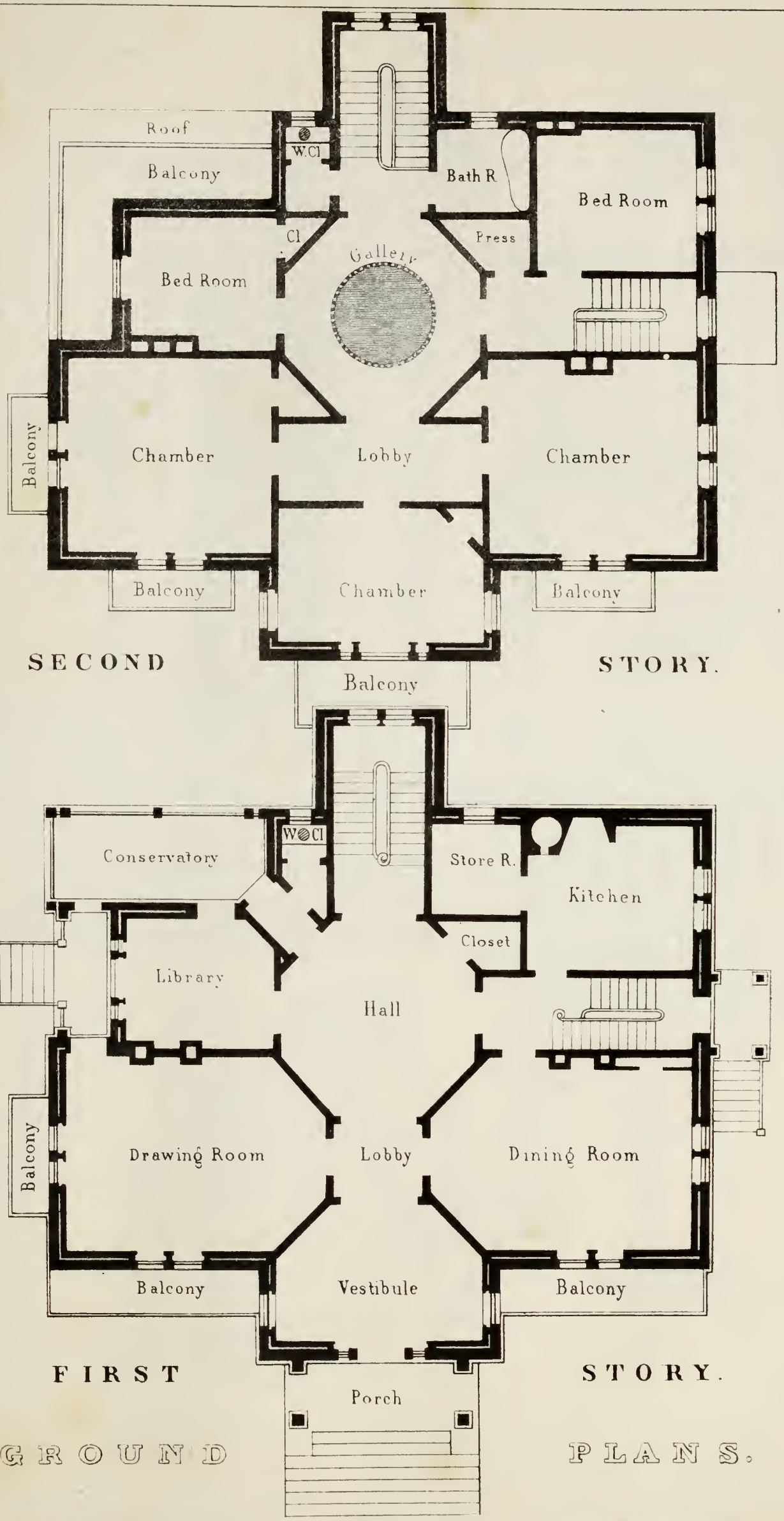
Excavation, 741 yds. @ 20 cts. per yd.	$148.20
Stone, 112 perches, quarry measurement, @ 90 cts. per perch,	100.80
Laying the same, including sand and lime, @ $1.25 per perch,	140.00
Brick, 118,000, delivered at $6.00 per M.	708.00
Lime and sand @ 90 cts. per M. brick,	106.20
Laying the same at @ $3.00 per M. brick,	354.00
Rough-casting, including all material, 790 yds. @ 45 cts.	355.50
Plastering, 2665 yds. @ 25 cts.	666.25
Centre flower in the parlor,	18.00
Centre flower in the dining room,	13.00
Centre flower in the vestibule,	9.00
Cornice girting 17 in. 216 ft. @ 17 cts.	36.72
Cornice girting 9 in. 400 ft. @ 9 cts.	36.00
Tiles for flooring, 468 ft. laid @ 42 cts.	196.56
Centre piece in hall, 12 ft. @ $1.25,	15.00
Scaffolding, 4000 ft. @ $12.00 per M.	48.00
Joists of spruce pine, 7500 ft. @ $17.00 per M.	127.50
Joists of hemlock, 7500 ft. @ $12.50 per M.	93.75
Joists for ceilings, 3100 ft. @ $12.50 per M.	38.75
Rafters, &c., for roof, 4800 ft. @ $12.50 per M.	60.00
Slating lath, 4350 ft. (in length) @ $5.00 per M.	21.75
Studs, 3 by 4 in. 5500 ft. @ $12.50 per M.	68.75
Studs next the doors, 3 by 8 in. 1000 ft.	12.00
Flooring boards, 6150 ft. @ $33.00 per M.	202.95
Main stairway, both workmanship and material,	160.00
Private stairway, " "	120.00
Front door according to plate,	26.00
Doors 2 inches thick, 8 @ $7.50,	60.00
Doors 1¾ inches thick, 16 @ $5.25,	84.00
Doors 1½ inches thick, 8 @ $4.75,	38.00
Windows, triple and twin, 14, the frames, sash, inside shutters and outside dressings delivered @ $35.50 to each window,	497.00
Windows, single, 10, frames, sash, &c., delivered @ $19.00,	190.00
Brackets of eaves over conservatory, 4 @ $5.25,	21.00
Brackets of the other eaves, 35 @ $5.00,	175.00
Brackets of gables and balconies, 37 @ $4.00,	148.00
Assorted lumber, 14500 ft. @ $28.00 per M.	406.00
Workmanship not stated above, 860 days @ $1.75,	1505.00
Carver's bill, including cost of material,	128.00
Slating, 3000 ft. @ 10 cts.	300.00
Tinning,	165.00
Painting and graining and sanding the exterior,	280.00
	$7879.68

Painting within and glazing, including material,	$450.00
Stained glass for window, 32 ft. @ $1.00,	32.00
Mortice lock for front door,	14.00
Mortice locks, 5 @ $6.50,	32.50
Mortice locks in the second story, 5 @ 5.00,	25.00
Locks of other doors, 22 @ $3.00,	66.00
Butts, silver plated, 9 pair, 4 by 5 in. @ $5.50,	49.50
Butts, silver plated, 4 pair, 4 by 4 in. @ $4.50,	18.00
Iron butts, 6 pair, 3½ by 4 in. @ 16 cts.	.96
Iron butts, 4 pair, 3½ by 3½ in. @ 15 cts.	.60
Iron butts, 12 pair, 2 by 3 in. @ 8 cts.	.96
Back flaps for shutters, 24 doz. pair, @ 45 cts.	10.80
Butts for shutters, 10 doz. pair, 2 by 3 in. @ 70 cts.	7.00
Front door bell and furniture,	5.50
Bells inside and fixtures, 6 @ $3.00,	18.00
Axle pullies, 4 doz. 1¾ in. @ 50 cts.	2.00
Sash cord, 18 lb. @ 31¼ cts.	5.62½
Sash lifts, 4 doz. @ 50 cts.	2.00
Brass clothes hooks, double, 1 doz.	1.50
Brass clothes hooks, single, 1 doz.	.62½
Mantles, 4 @ $30.00 each,	120.00
Wrought iron work, 2½ cwt. @ $10.00,	25.00
Nails and spikes, 21 kegs @ $4.50,	94.50
Lightning rod of twisted wire, 80 ft. @ 15 cts.	12.00
Platinum point for the same,	4.00
Lining the reservoir with lead,	34.00
Force pump,	30.00
Bath tub and sink,	29.50
Shower bath over the tub, with brass shower,	17.00
China bowls in the chambers, 2 @ $3.00,	6.00
Plated stop-cocks to the same, 4 @ $5.00,	20.00
Stop-cocks elsewhere, 7 @ $2.50,	17.50
Lead pipe, 210 ft. @ 20 cts.	42.00
Fitting up the whole complete,	45.00
Water closets, 2, with soil-pipe, 17 ft. @ 70 cts.	161.90
Ventilators, 6, Dr. Arnott's self-acting, @ $3.00	18.00
Furnace, Chilson's No. 4, including setting,	140.00
Register for the parlor, plated, 11 by 16 in.	17.50
Register for the dining room, black, 11 by 16 in.	7.50
Register for the hall, octagon, polished,	16.00
Register for the library, black, 11 by 12 in.	4.00
Registers in 2d story, 5, black, 9 by 14 in. @ $4.75,	23.75
Cooking range, &c., complete and set,	125.00
	1752.72
	7879.68
	$9632.40

Sam^l Sloan Arch^t

FRONT ELEVATION.

SIDE ELEVATION.



P.S. Duval's Steam Lith. Press Phila.

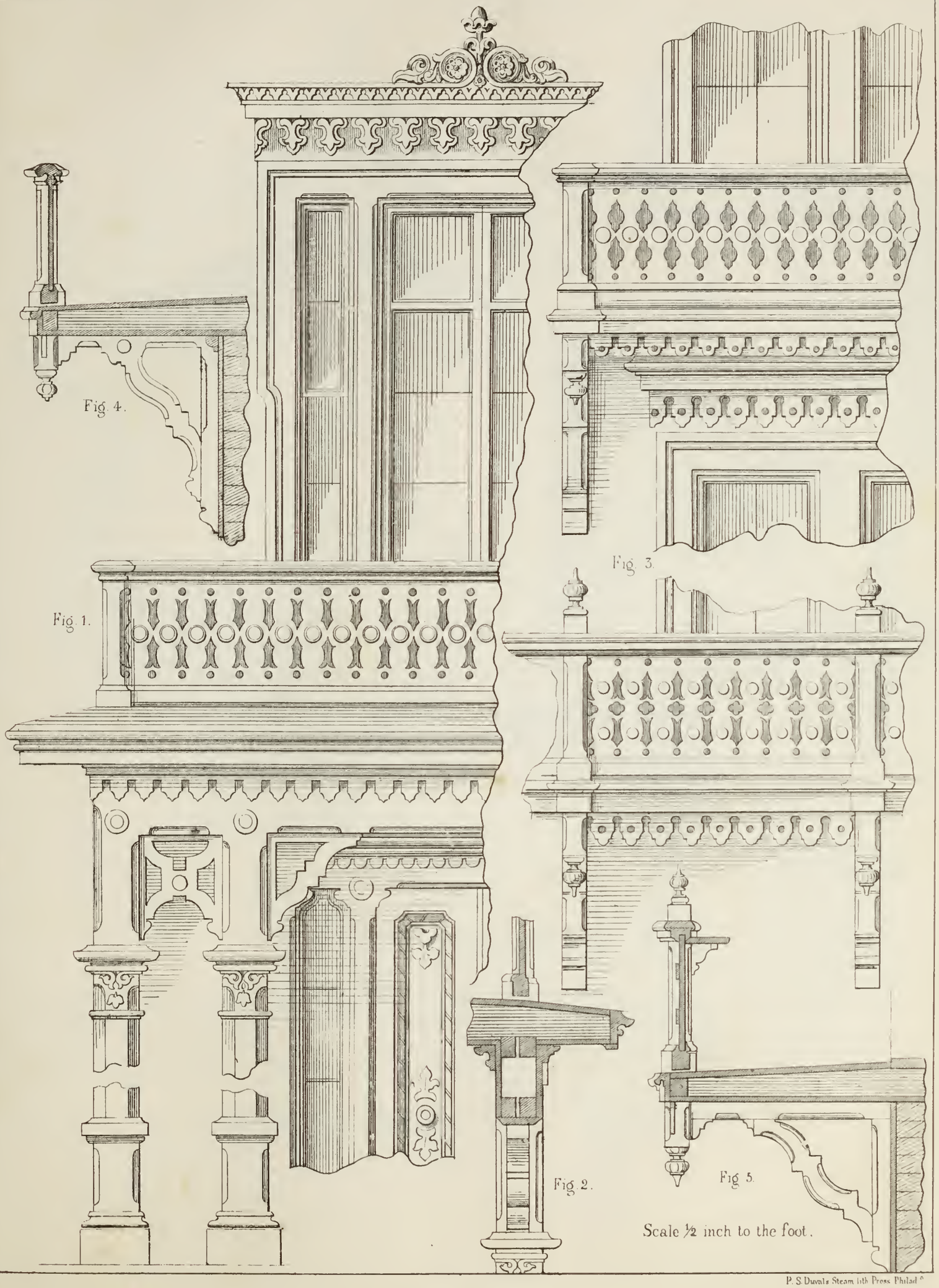


Fig. 4.

Fig. 3.

Fig. 1.

Fig. 2.

Fig. 5.

Scale ½ inch to the foot.

P. S. Duval's Steam lith Press, Philad.ª

DETAILS.

Fig. 1

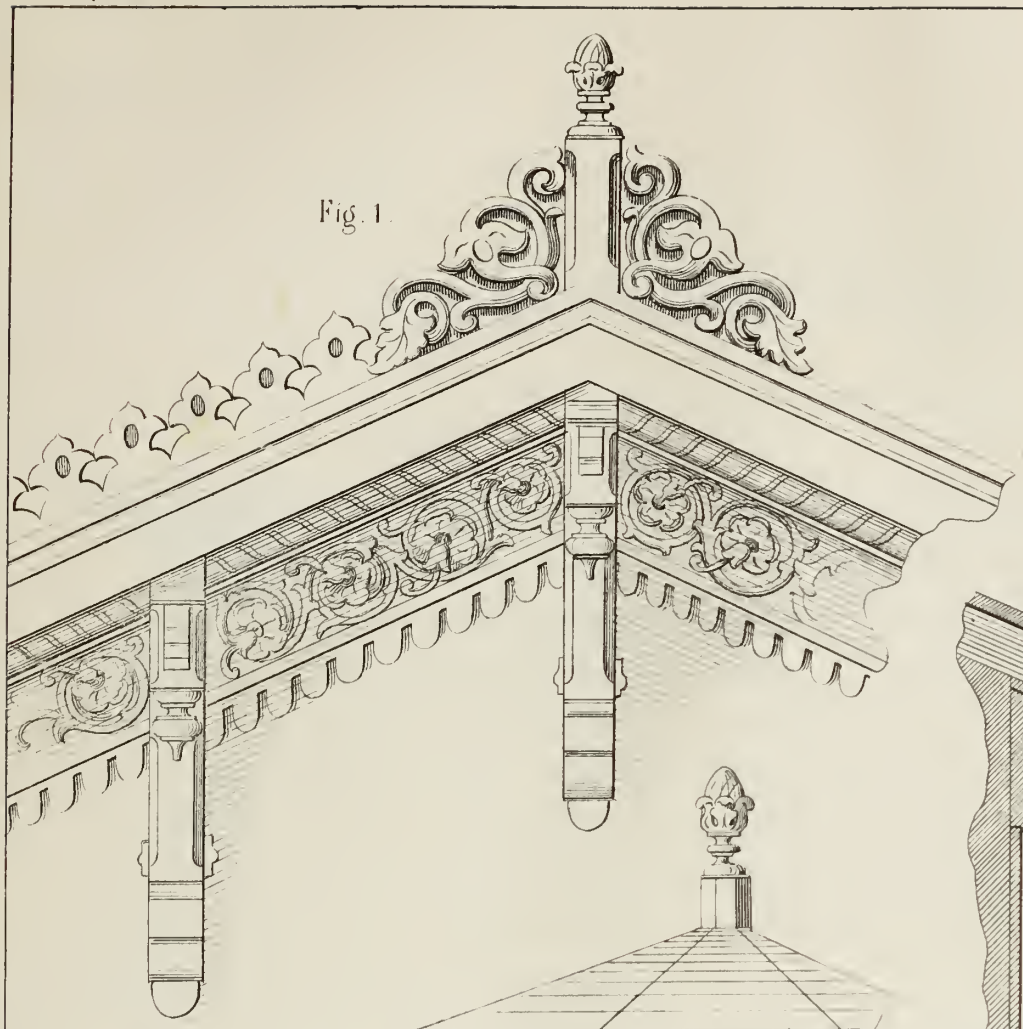
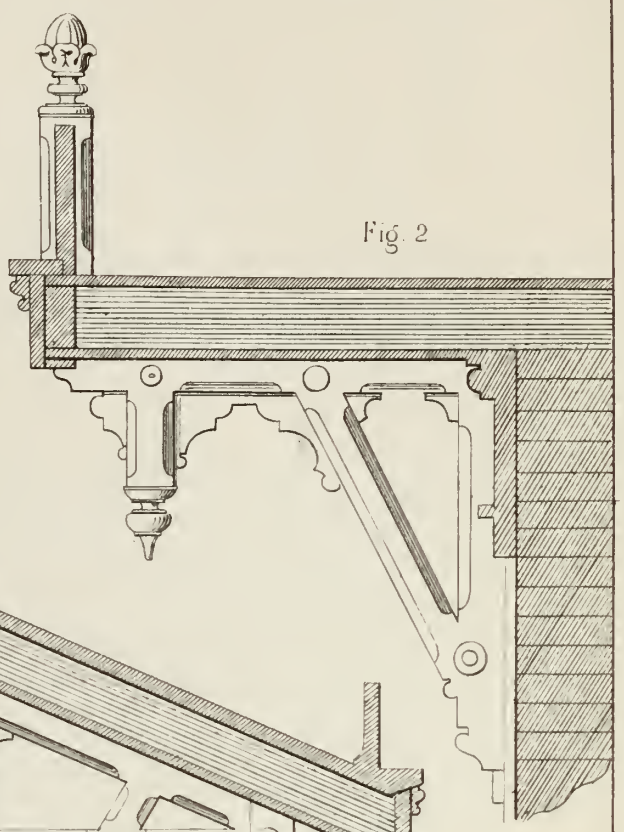


Fig. 2



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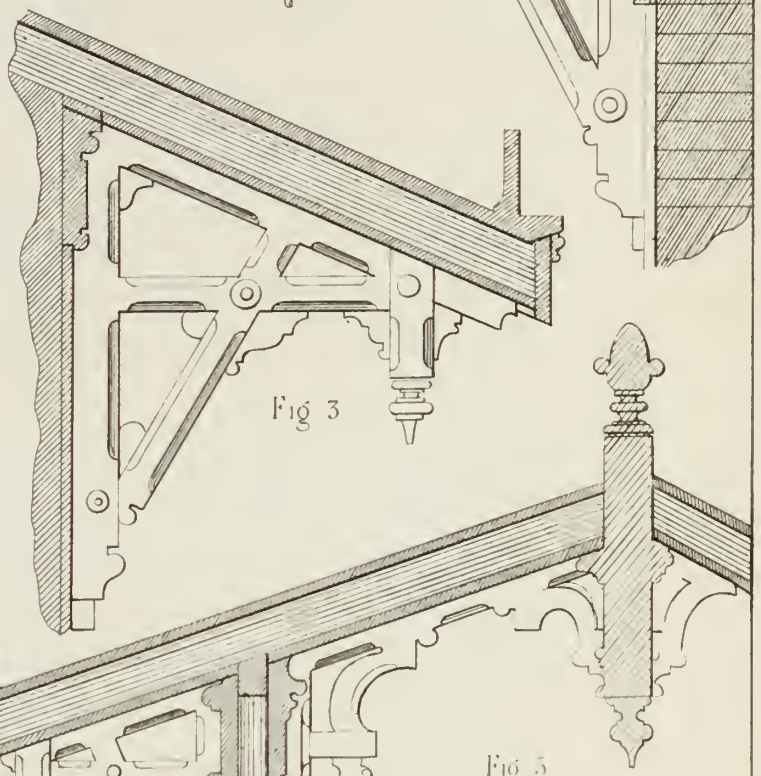
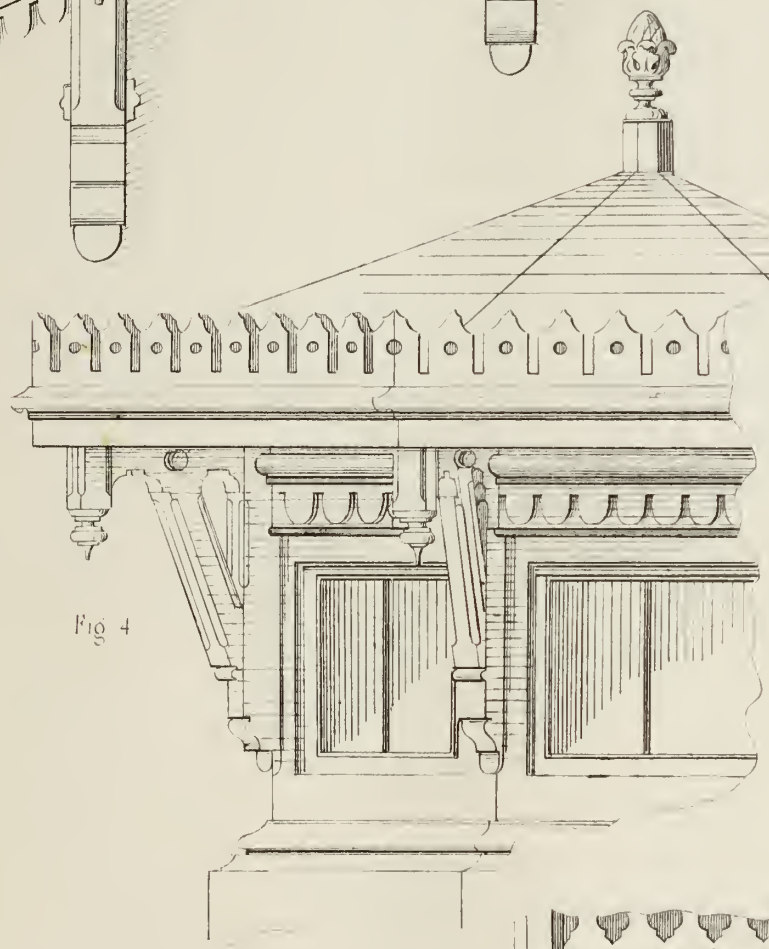


Fig 4



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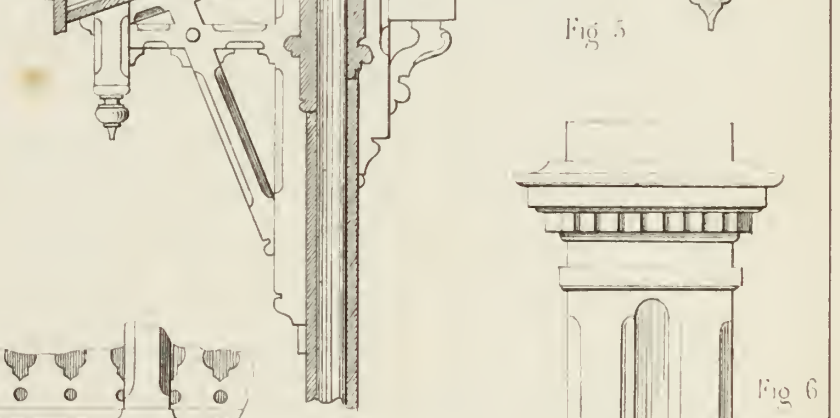
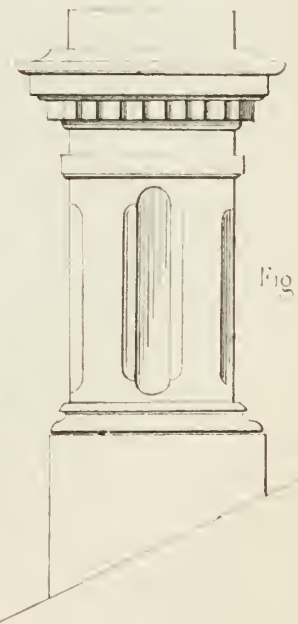


Fig 6



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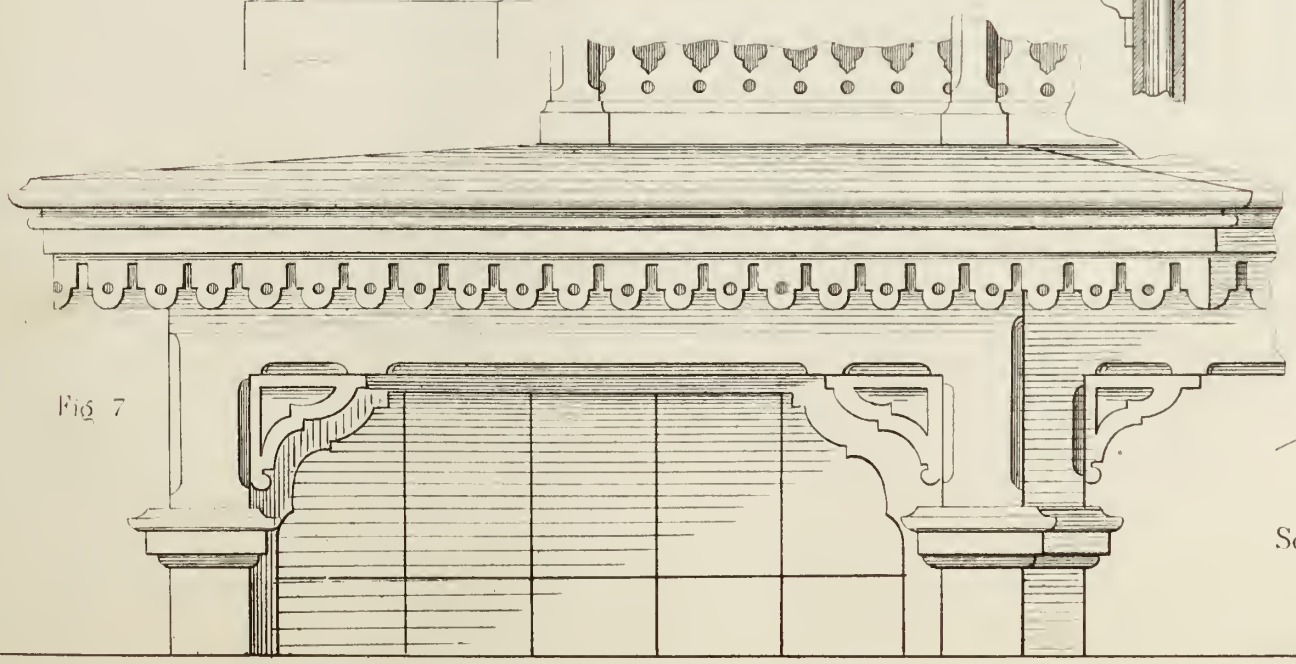


Scale ½ inch to the foot

P S Duval's Steam Lith Press Philad.

DETAILS.

NORMAN ARCHITECTURE.

NORMAN Architecture was the precursor of the Gothic, and its origin may be traced to the buildings of the northern barbaric hordes who over-ran Italy. With the fall of the Roman Empire, as was remarked in a previous article, Architecture suffered a great depression, and has not since returned to its former position. When Italy became independent again of foreign power, and the works of Vitruvius were discovered, then old principles were resumed and the labor of perfecting was carried on with vigor; but until that time, even in Italy, barbarous modes prevailed. The Goths, who retained supremacy there during nearly a century, did nothing for the advancement of the art. They used the materials of overthrown temples, attaching highly sculptured ornaments to the rude massive walls of their castles and palaces, thus producing harsh contrasts and falsity of expression that exclude their mode from the domain of art.

The Lombards succeeded the Goths in northern Italy, and founded a kingdom which lasted for two centuries. In building they used new materials and exhibited much taste and skill, combined with considerable originality. They were influenced doubtless by the buildings of the Goths and the remains of the destroyed empire; but their edifices were very rough, and being constructed principally for the purposes of defence, had immense massive walls from six to nine feet thick. In the year A. D. 590, Theodolina, queen of the Lombards, embraced the Catholic faith and endowed several ecclesiastical establishments, and in constructing buildings for their reception, a higher order of art was attempted. The massive walls were retained, but the windows were more frequent, larger, and arched at the top. The influence of the monuments around is perceptible in the production of these very creditable edifices.

Charlemagne expelled the Lombards, and in the year 800 ceded the government of Italy to the Pope. The Lombards were scattered throughout Europe for a time, and communicated their knowledge of Architecture to the more barbarous tribes in France and Germany. These, feeling the need of military fortifications, erected buildings for the purpose, in imitation of the Lombardic manner.

During the ninth century the Normans settled in the north of France, a province having been granted them by Charles the Simple. They soon afterwards embraced the Christian religion and began to erect edifices for its conduct. Their superior energy of character and their zeal for the new religion, caused them readily to surpass their cotemporaries in the art. The ecclesiastics labored night and day, both as architects and artificers, and the monasteries exceeded even the castles of the nobles in magnificence. All their buildings were upon a more elegant and grander scale than those in the Lombard style, and finally

differed from them materially in general design, ornament and execution. The massive proportions were disused, and the walls diminished in thickness were built to a greater height. Their edifices nevertheless appeared cumberously heavy, but they ceased not to improve in this and other respects until the style gradually changed to the Gothic, and although these improvements were every where diffused, yet on the continent the mode was never distinguished by any particular name, but was termed, with that which preceded it, the Lombard style.

William, Duke of Normandy, afterwards self-styled the Conqueror, invaded England in the year 1066, and having become possessed of the throne, sought to secure his conquest by building castles in various places. Among these was the tower of London which served both as a stronghold and palace. He also gave every encouragement in his power to the depressed church. Under his auspices it increased rapidly in power and wealth. Cathedrals, abbeys and other such buildings went up in all directions, each endeavoring to excel its neighbor, until every little town had something of which to boast and be proud. Thus the Norman soon supplanted the Anglo-Saxon style which formerly prevailed in the island. When the government became more settled, such impregnable fortresses as their castles were not requisite, and more attention began to be paid to comfort. The advance of the style was now characterized by greater lightness in construction and delicacy in details. The windows were increased both in size and number, and the carvings were more profuse and less rudely executed.

The unsurpassed skill in adapting mathematical principles which characterized the mediæval architects may be attributed almost entirely to the labors of the society of Free Masons, whose origin as a guild is lost in obscurity, but who at this time were gathering knowledge and strength. They roved in bands from place to place wherever there was a castle or church to build, and by their intercommunication, secrecy and united action soon monopolized the erection of all large edifices. In the twelfth century they were granted great privileges by the Pope, and to their scientific skill we owe those grand monuments of that and succeeding ages. The ramifications of this powerful fraternity extend throughout the world, but it has long since ceased the practice of Architecture, and we have great cause to regret that so many of their records, which would be of practical value in the art, have been destroyed.

About the middle of the twelfth century a radical change began to exhibit itself in Architecture. The transition was easy but decided, and as has been before remarked, at the close of the century the style had so changed as to receive a new name, the Gothic. The Norman style prevailed in England for about a hundred and fifty years. On the continent it merged into the Gothic about the same time as in England, but having existed earlier, it may be said to have prevailed there under a different name for about a century more. During this time it was continually undergoing gradual changes and improvements.

Norman buildings were principally of two kinds, those for religious service and those for the purpose of defence, both being used as habitations. The castles were erected in provinces or districts with huts of poor construction, the homes of the peasantry, scattered around. The chief man of the province with his

retainers occupied the castle, to which all repaired in times of danger. Ecclesiastical edifices were sometimes simply for worship, but generally they were also the dwellings of the ecclesiastics, hospitals for the afflicted, the refuge of the oppressed, and sufficiently strong to be put in a state of defence when necessary. The plan of the churches was peculiar and every where the same. It was taken from that of the Roman Basilicæ, or halls of justice, many of which were used by the early Christians as places of worship, and found so convenient for the purpose, that the plan was universally adopted. When the service of the church began to require more space, a transept was added which gave the plan the form of a Latin cross, the upper part of which, so to speak, always laid towards the east and was called the chancel, the western portion, being the main body of the building, was called the nave, and the southern portion of the transept was the choir. The form of other buildings, and that of the castles, was subject to no particular rule. They were oftentimes surrounded by a heavy wall and had watch-towers, strongholds and dungeons.

The walls of the buildings were of immense thickness. The outer courses were mostly constructed of ashlar-work or "clene hewen stone," as it is termed in the old contracts and the intermediate space filled with grouted rubble-work. Sometimes this rubble-work was used for the outer courses, the buttresses and angles only being of ashlar-work, and in all cases the joints were very wide. Buttresses were not introduced until the wall was so diminished in thickness as to render them necessary to resist the lateral thrust of the arches. They were so flat as to resemble pilasters, and either ran into the corbel-table, thus presenting the appearance of panelling, or finished into the wall just beneath the cornice. The embattled parapet which surmounts the walls of many towers is supposed to be of subsequent construction, but is certainly a fine addition. Heavy string courses are common, both plain and moulded.

The tower of this style is either round or angular. In very large churches it was erected on the intersection of the nave and transept, but in others it either occupied the angles formed by the intersection, or the western corners of the edifice. In other buildings it had no particular position, but was generally placed at an angle of the walls, which it always overlooked. It was frequently surmounted by a conical roof of wood or tiles, with overhanging eaves, which form was afterwards elongated and became the spire. Of the roof of the main building we can say nothing, no specimens being extant.

The principles of the arch were well understood by the Normans. Beneath their buildings were found extensive crypts and vaults, both barrel and groined, whose stability has shown them to be of excellent construction. All doors and windows were headed with an arch, which was stilted when the style approached its term. The openings had above them the semi-circular hood-mould, resting on ornamented corbels. No part of the structure received so much attention as the portals. Occasionally porches were used, and always the doors were deeply recessed in the wall. In the latter stage of the style they were elaborately enriched with mouldings of various patterns, and the archivault was composed of numerous ribs. Whatever of sculpture adorned the building was generally placed on or near the doorway. The tympanum was often decorated with rudely executed bas-relief, generally symbolical or grotesque. In this work there

was no effort at high finish, a striking bold effect being only desired. The windows were long, narrow and decorated with mouldings. They were placed either singly or in pairs, and were sometimes ranged in arcades. In these arcades we may occasionally see the intersecting arches from which the pointed arch of the early Gothic was derived. There is a fine instance of this in the Croyland Abbey Church, Lincolnshire, where a range of pointed arches occurs immediately below such an arcade.

The mouldings of the Norman style are peculiar and characteristic. The most frequent is the chevron, or zig-zag, from which nearly all others and the tooth-moulding of the early Gothic originated. There are besides this the embattled, the double cone, the alternate billet, the lozenge and others. The running mouldings and arch ribs were of various patterns. The cornices, doors, windows and piers only received these ornaments.

The piers on which these arches rested were at first made heavy, and plain, but as the style advanced they were more finished and ornamented. The body of the pillar was generally square with a cylindrical shaft placed against each side. The corners of the square continued formed the groin, and the shaft also continued formed the arch. Occasionally it was composed entirely of clustered shafts, which at the doorways were embedded in the jams and so arranged as to be continuations of the arch ribs. The cap just beneath the point of impost was either plain or richly sculptured with foliage or other fanciful designs, and the base was formed of moulded bands much resembling those of the classic orders.

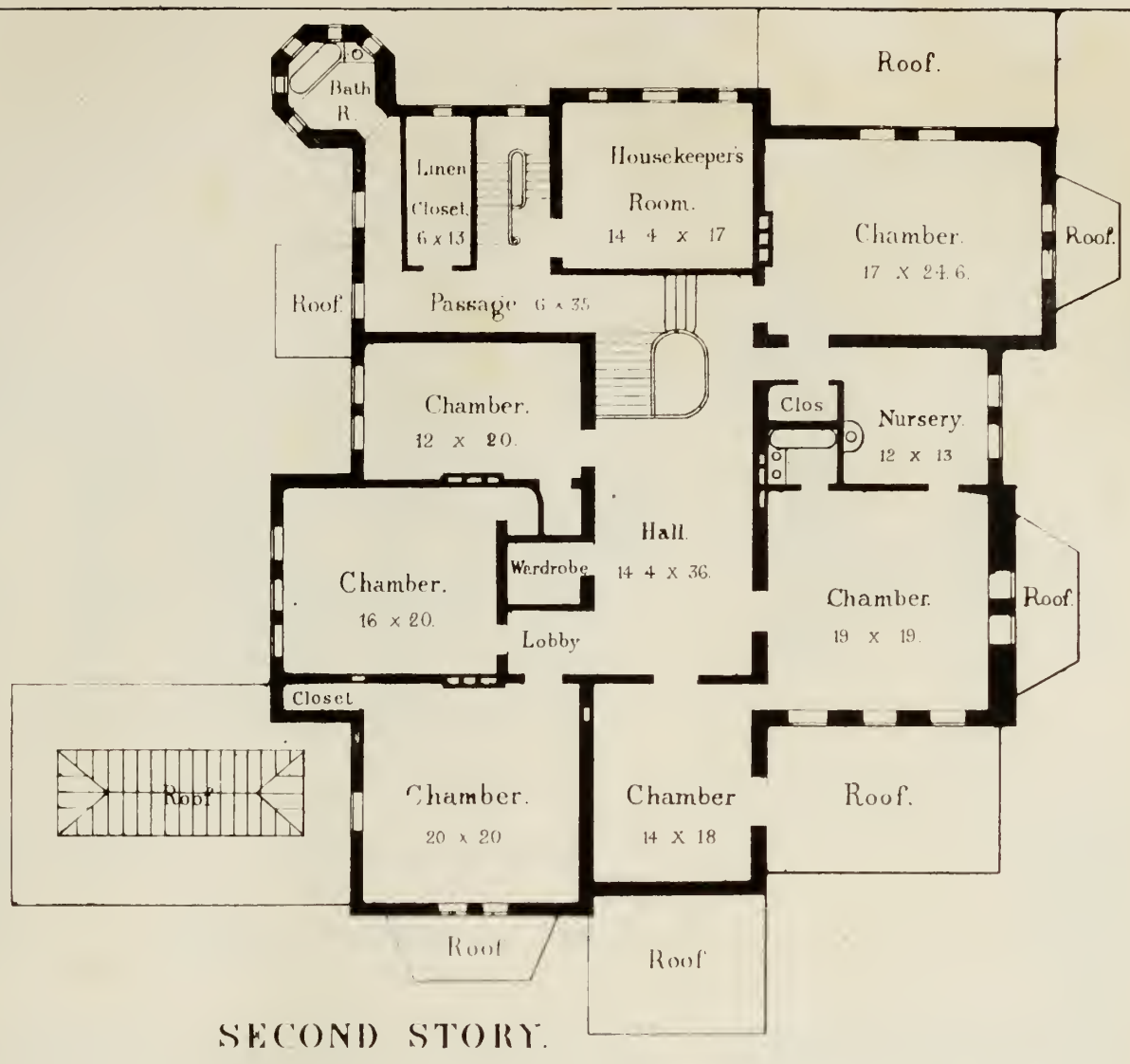
The Normans in their partially civilized state knew but little of the comforts of living, and although they took great pride in their buildings, yet the peaceful arts did not occupy much of their attention. They supplied by manual skill, patience and perseverance, all mechanical deficiencies, and the expression of the style is in general very bold, great strength being combined with vast and ponderous magnificence.

Of the adaptation of the Norman style to modern purposes a word may be said. For all public buildings, such as Capitols, Departments, Court-Houses, Prisons, Military Establishments, &c., where something beyond mere brick and mortar is desirable, the style stands without a rival, and for Collegiate Institutions and Libraries it is better adapted than any other with which we are acquainted. For Churches it is only surpassed by the Gothic, whose lofty and impressive grandeur seems to claim this as its peculiar province. In adapting the classic orders to our purposes, it is almost impossible to retain that purity which is their greatest charm, but we may produce buildings in the mediæval styles, which, with entire truthfulness, will combine harmony of expression and purpose. The great pliability of design which belongs to these styles, gives them advantages over every other, for they admit almost any arrangement, and hence, need not be servile imitations such as the classic orders require. An elaboration of these views may be found in the "Hints on Public Architecture," where the accomplished author has given extended and popular illustrations of this subject. For dwellings, this style is only adapted to those on a large scale. Its heavy, bold, and rich expression would be lost in a building of small size, but for an extensive villa it presents most admirable features. The design here given speaks to the point.

Sam[l] Sloan Arch[t]

P S Duval's Steam lith Press Philad[a]

A NORMAN VILLA.



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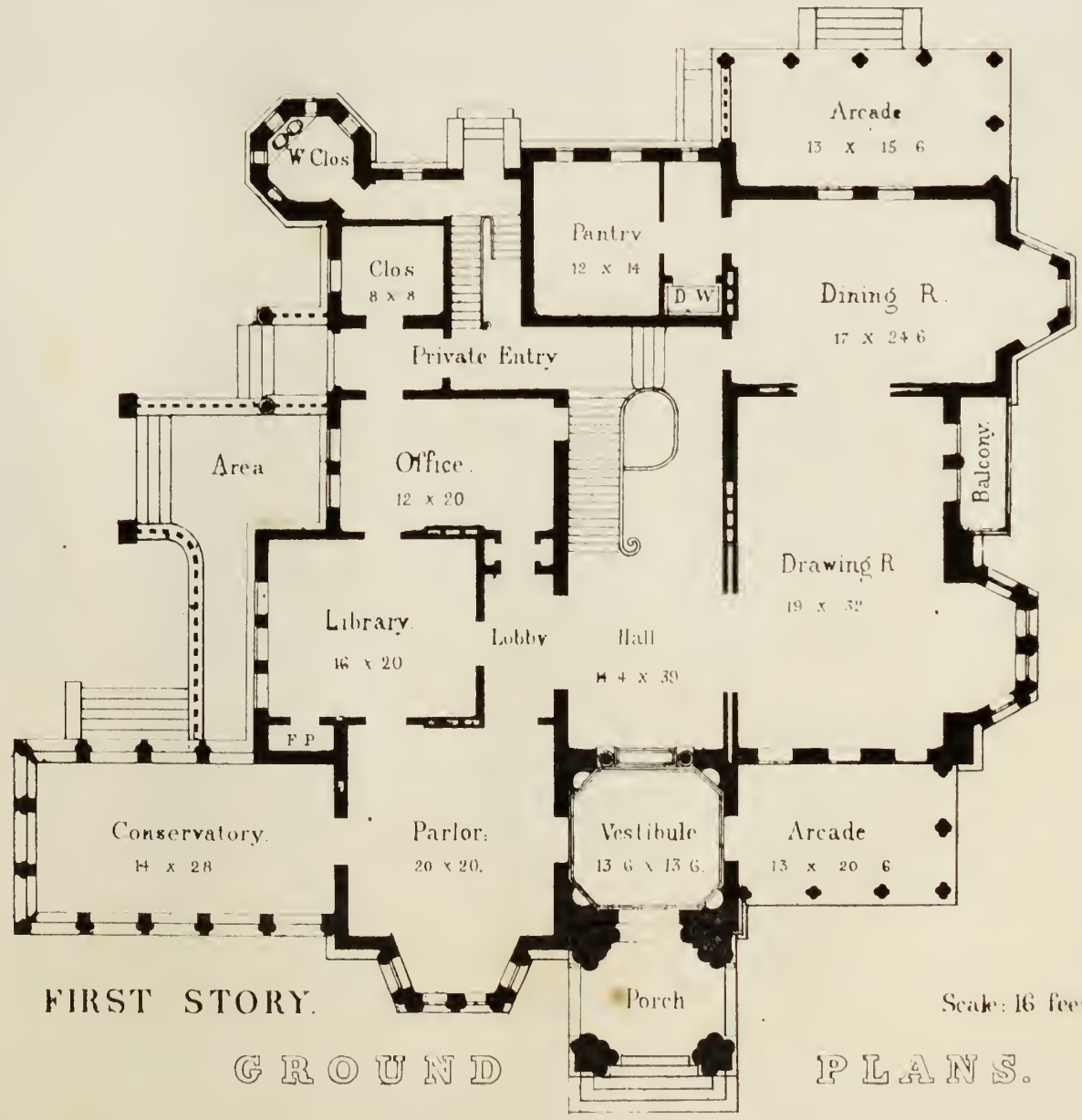

FIRST STORY.

Scale: 16 feet to the inch

GROUND PLANS.

P. S. Duval's Steam Lith. Press, Phila.

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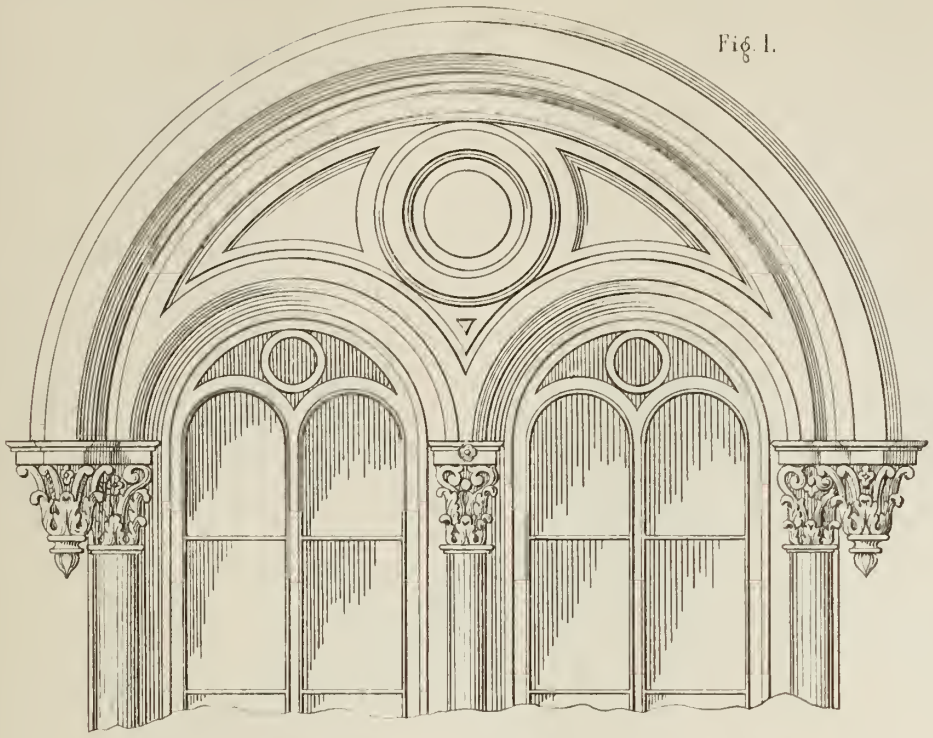

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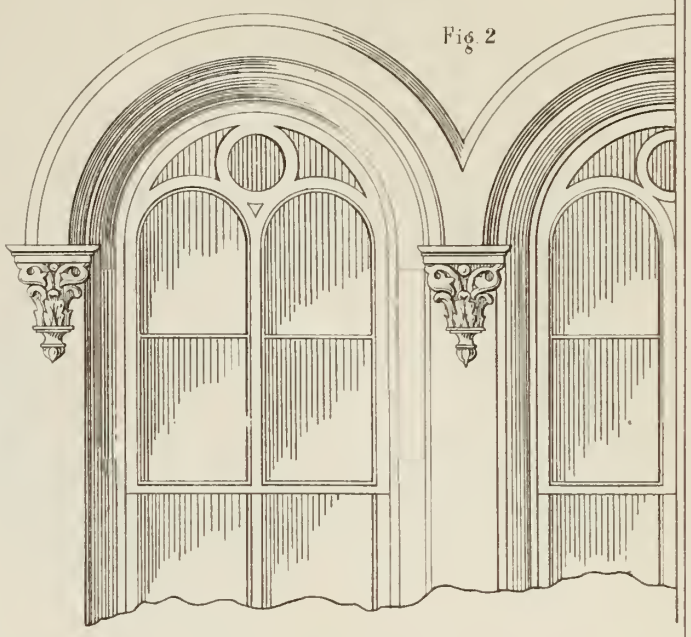

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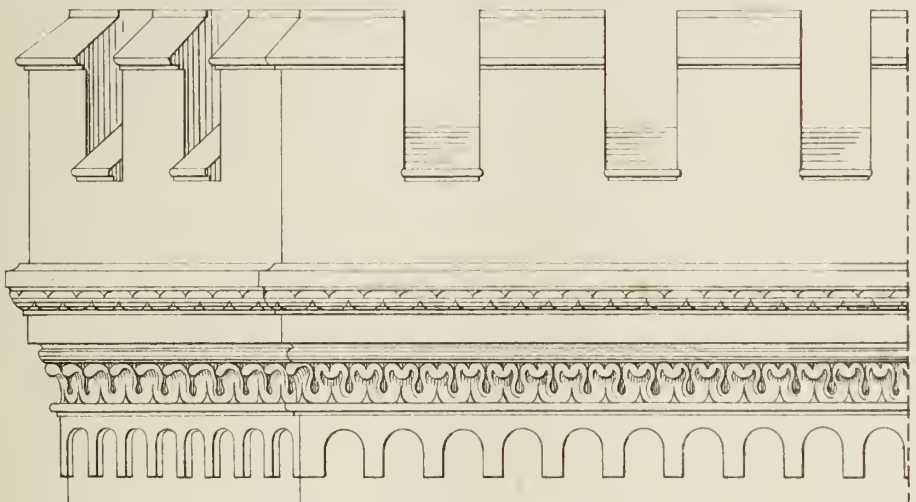

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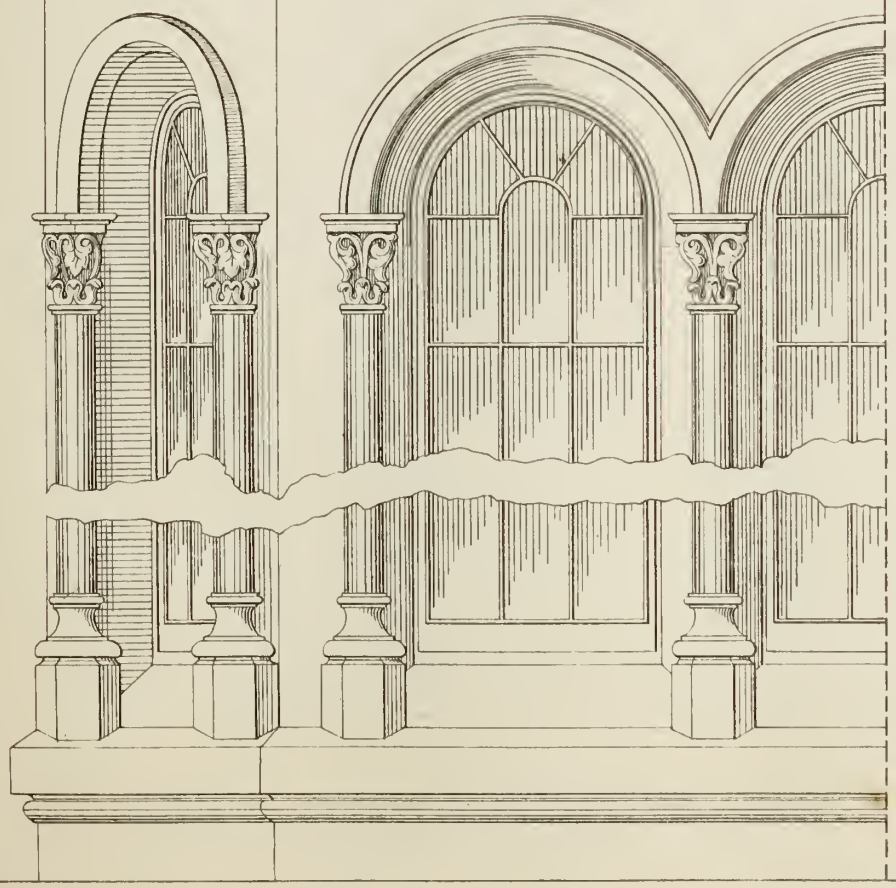


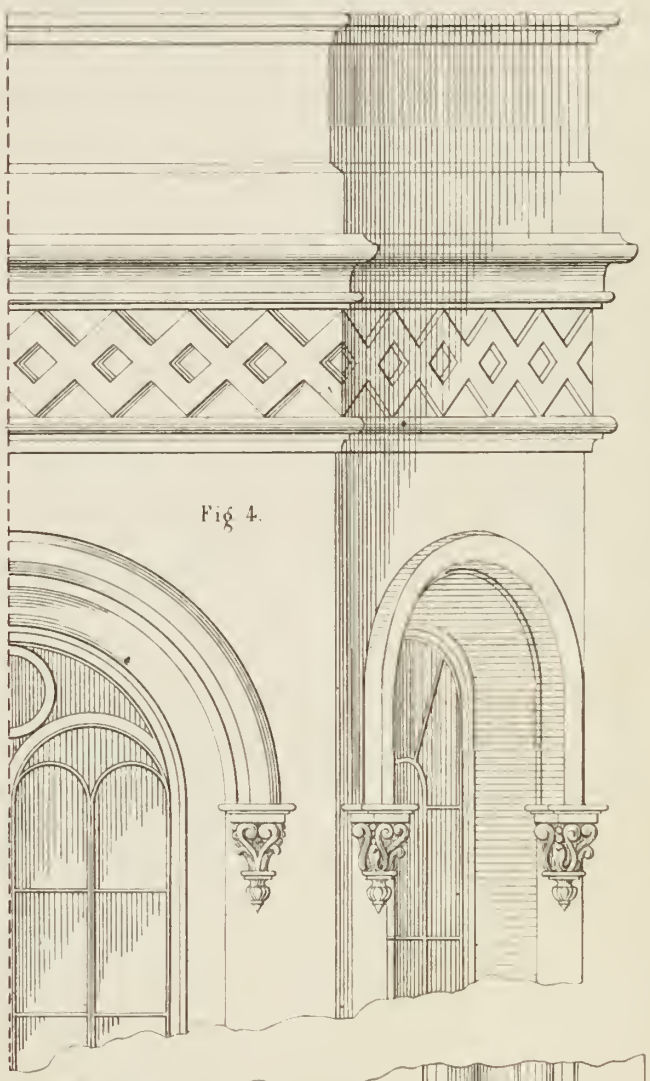
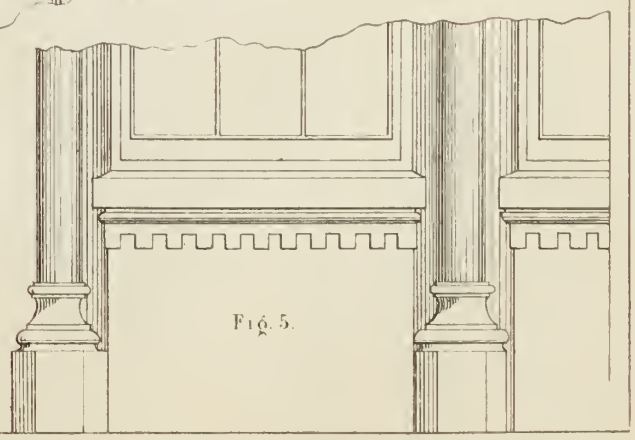


Fig. 4.

Fig. 5.



P.S. Duval's Steam lith. Press Philad.ª

DETAILS.

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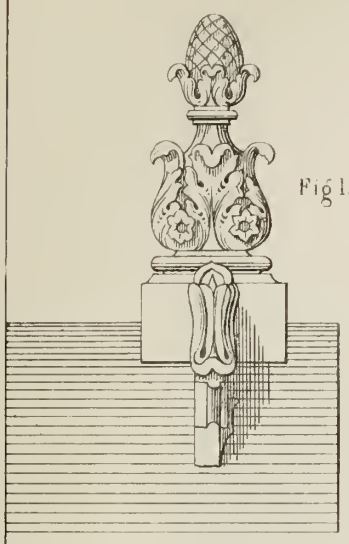

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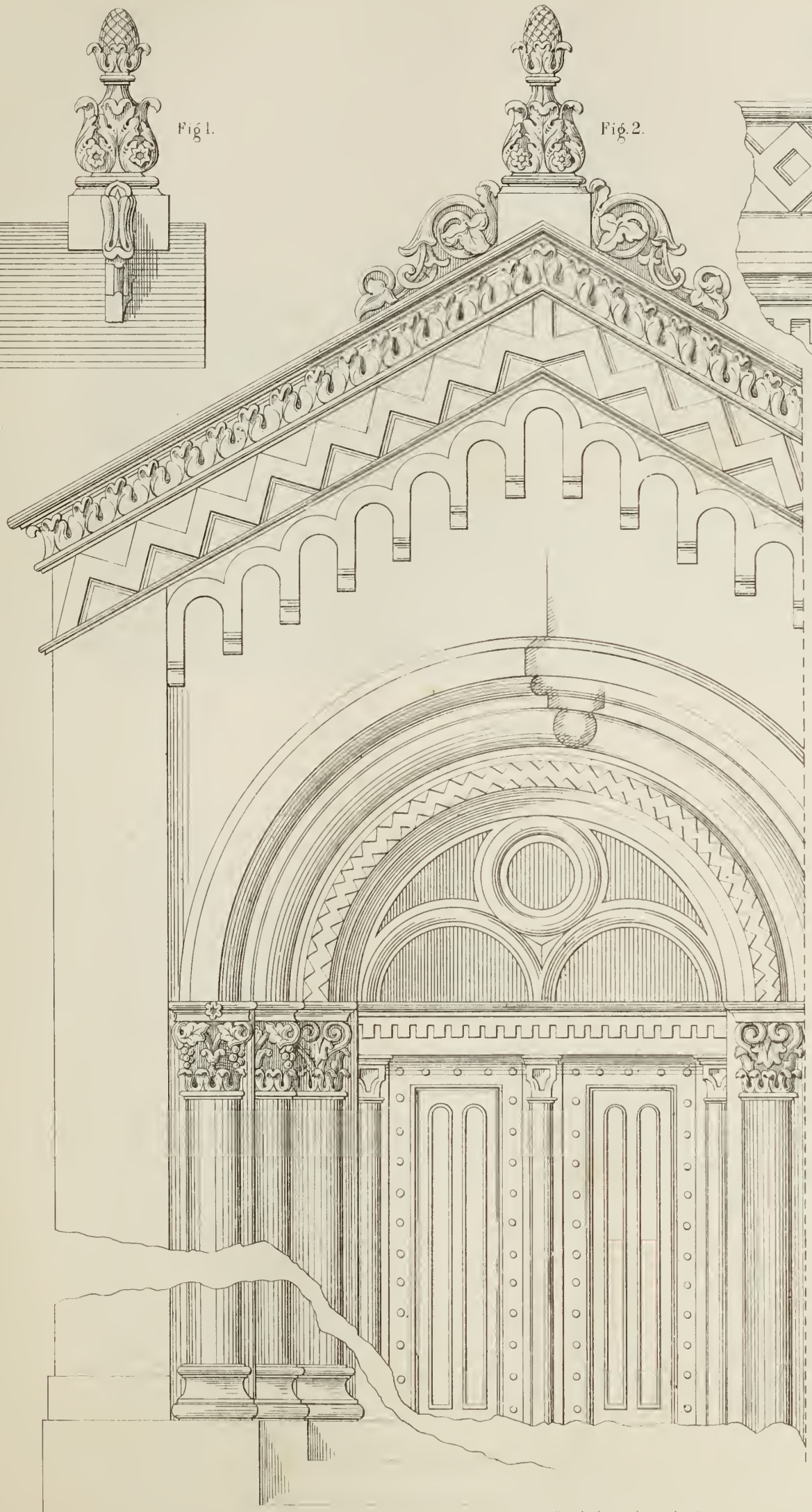
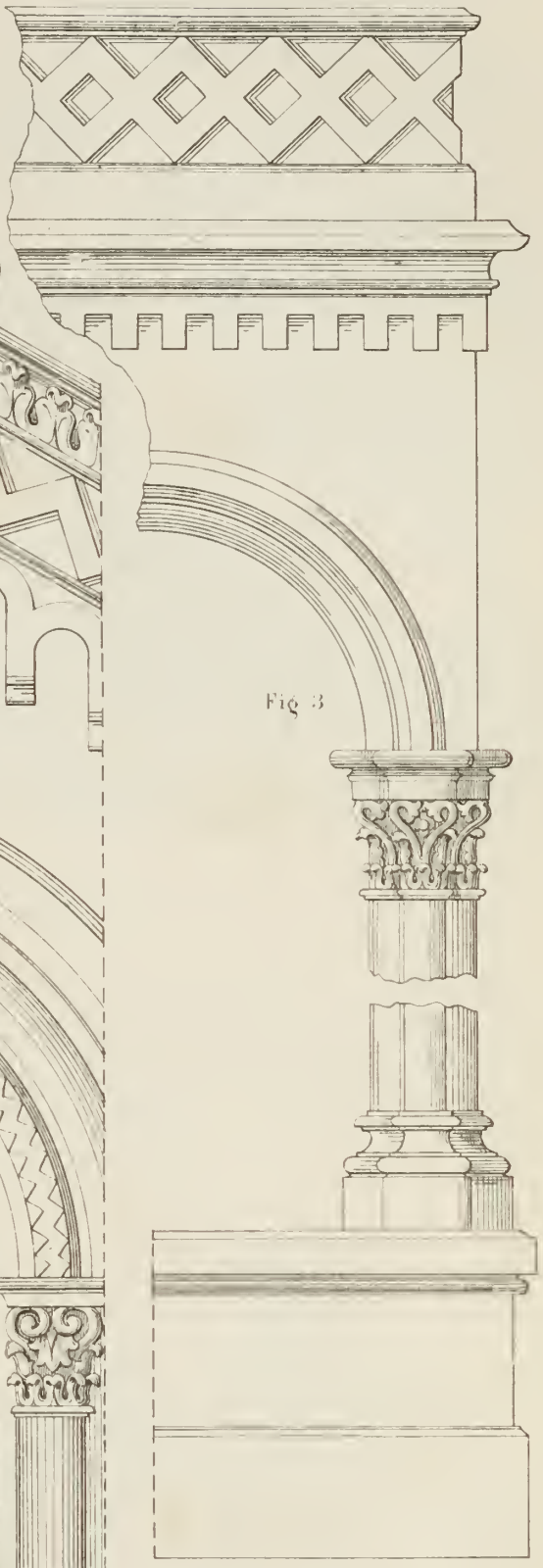


Fig 3



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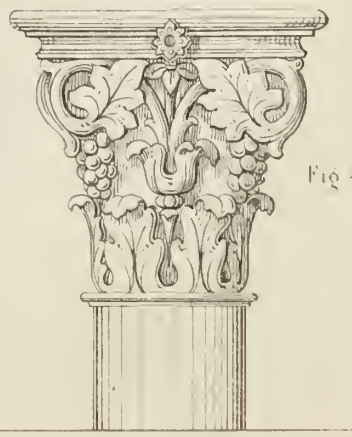


Scale ½ inch to the foot

P S Duval's Steam Lith Pr[illegible] Phila[illegible]

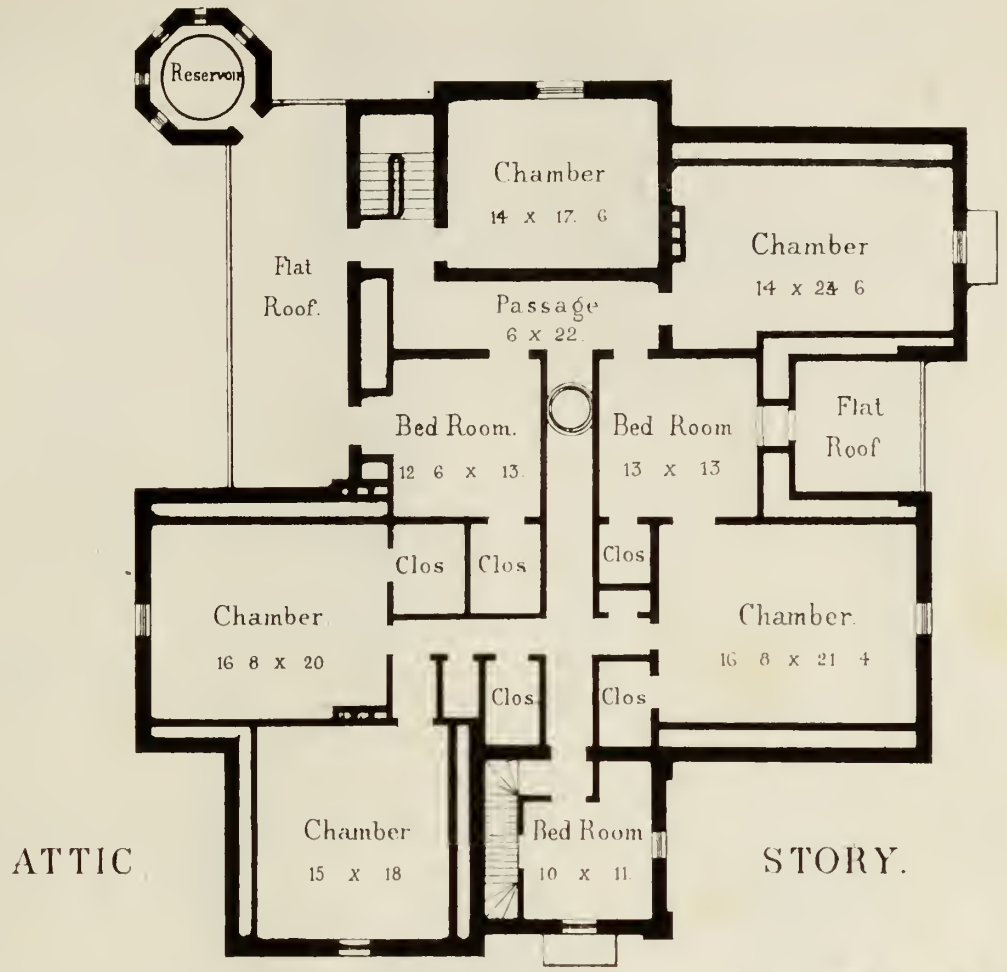
DETAILS.

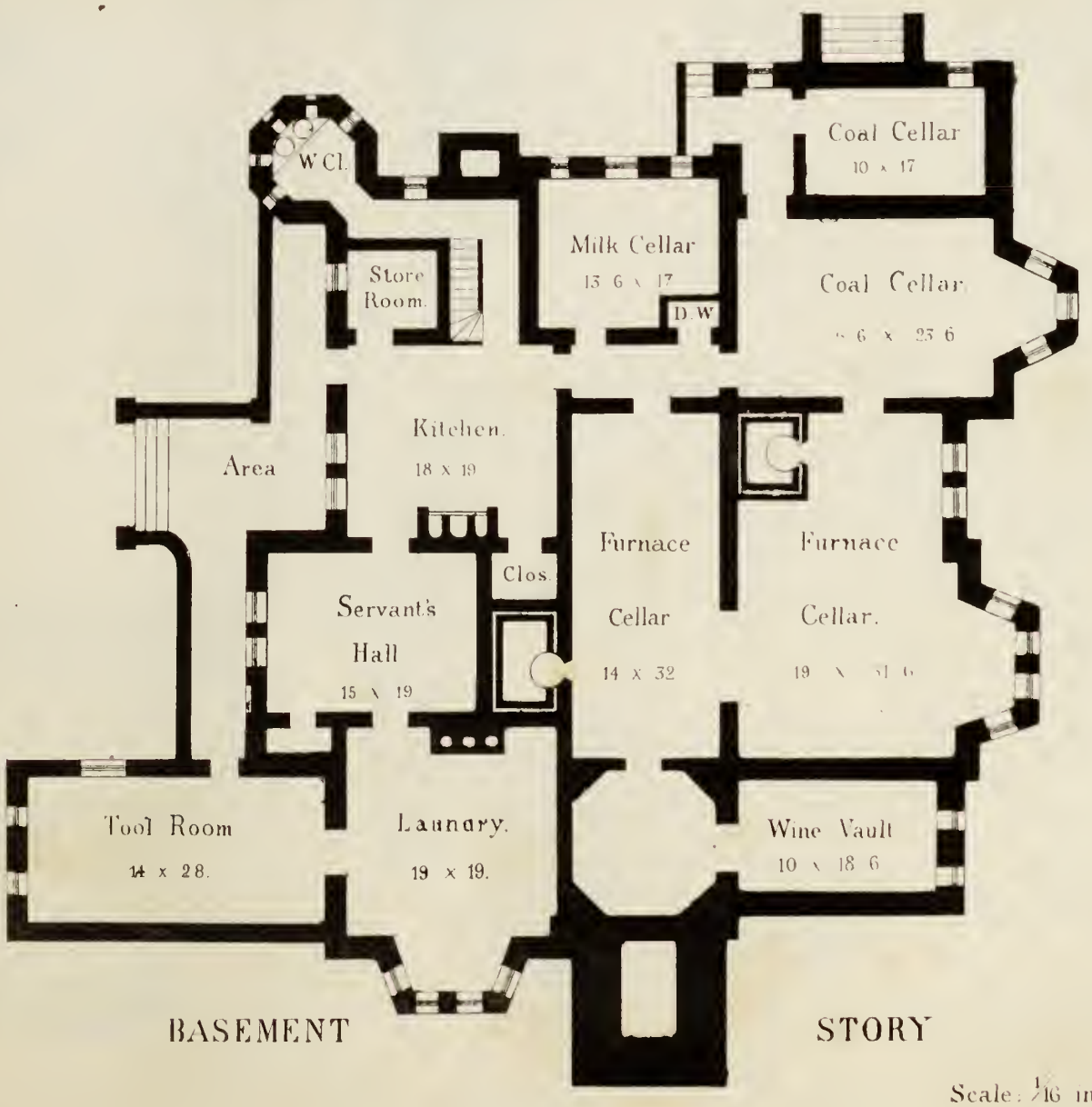
Sam[l] Sloan, Arch[t] P S Duval's Steam lith Press Philad[a]

REAR ELEVATION.

Sam[l] Sloan, Arch[t] P S Duval's Steam lith Press Philad[a]

SIDE ELEVATION.

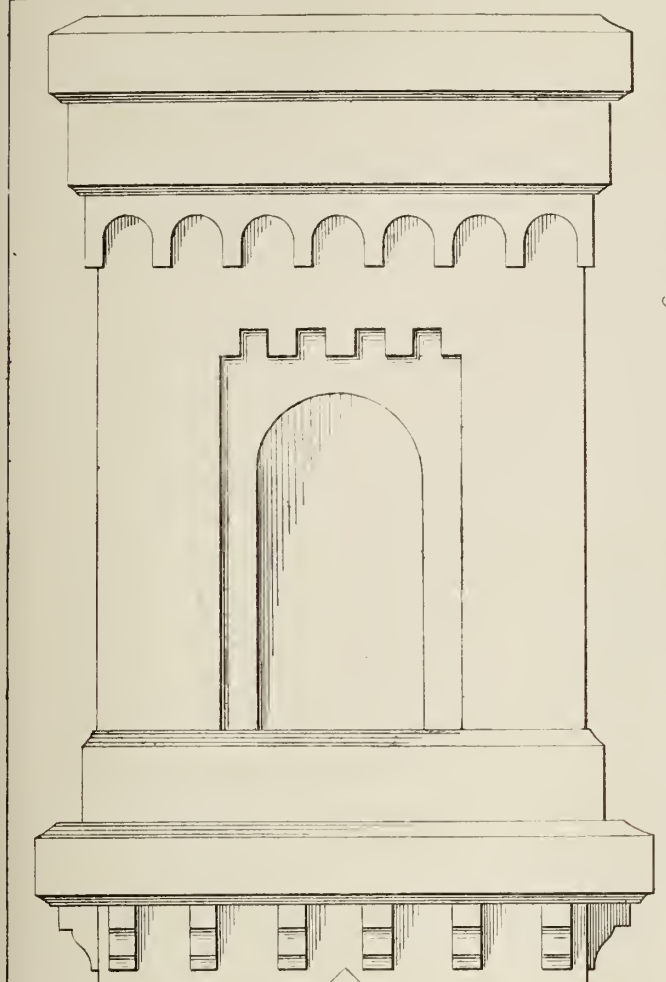




Scale: 1/16 inch to the foot.

P. S. Duval's Steam lith. Press Philad.ª

GROUND PLANS



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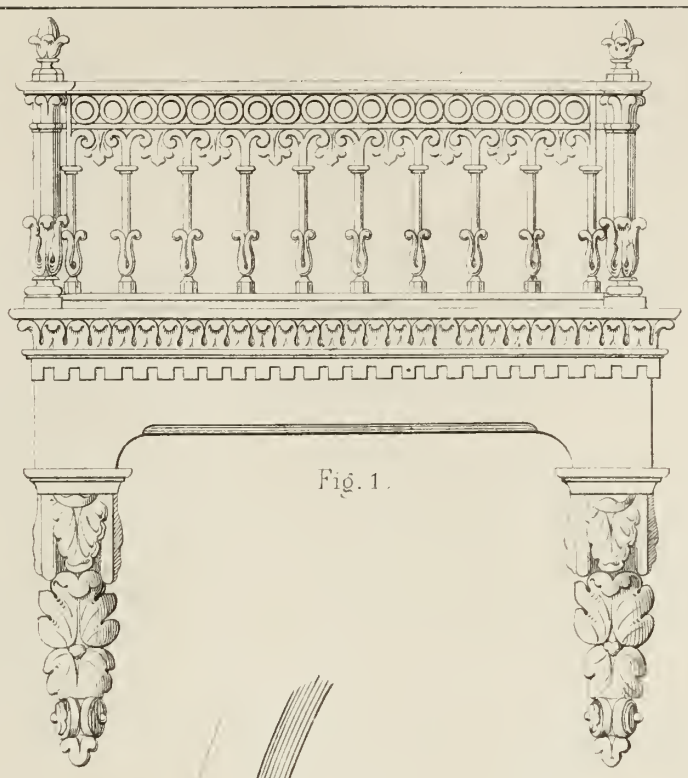

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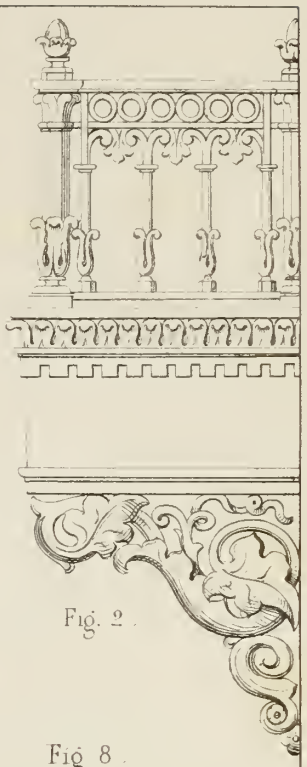

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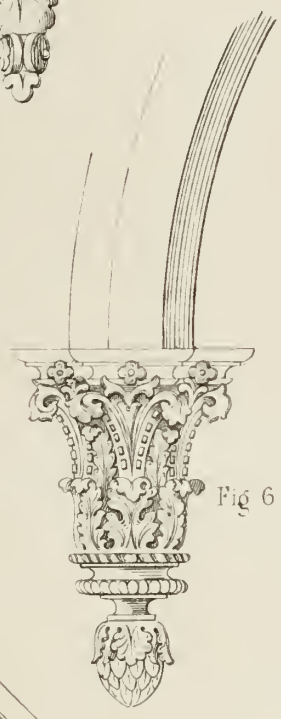
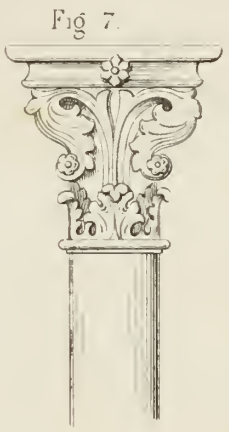


Fig. 6



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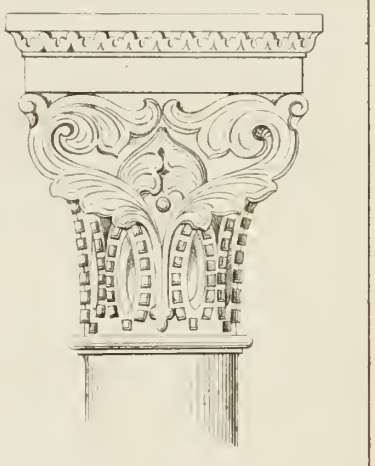
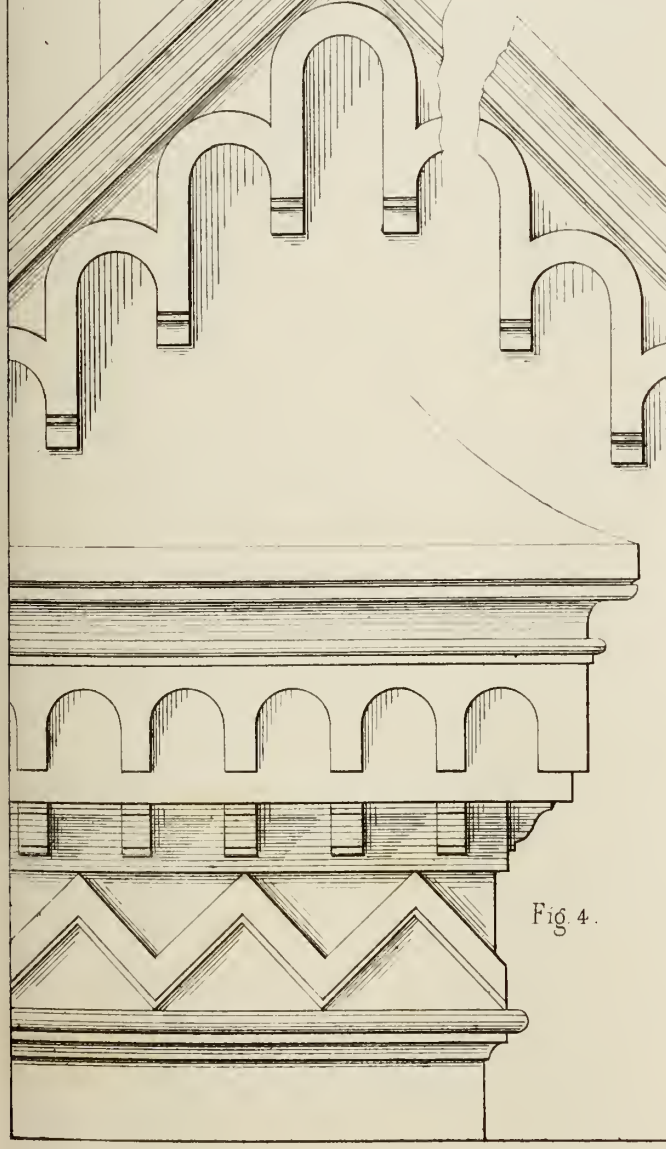


Fig. 8.

Scale of Fig.s 6.7.8.9
one inch to the foot



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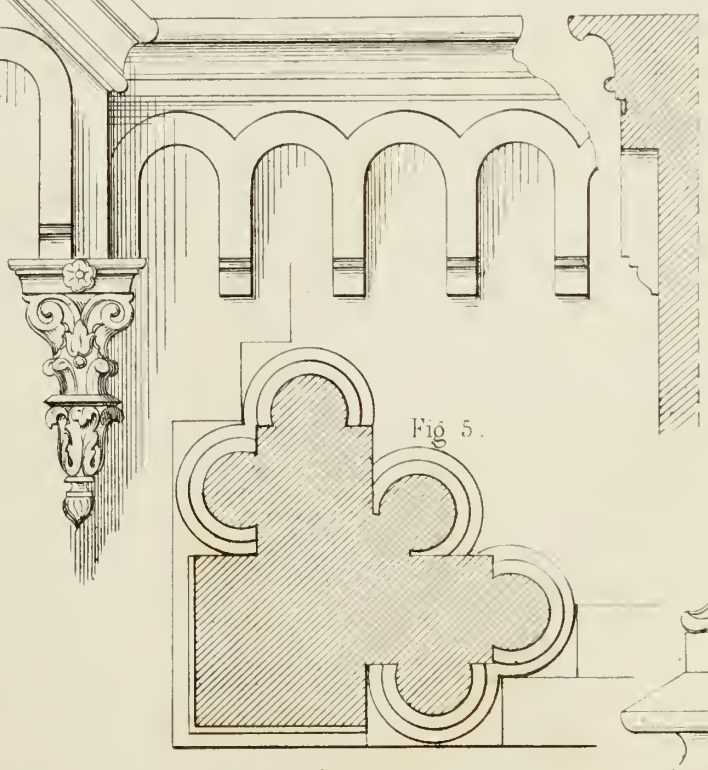

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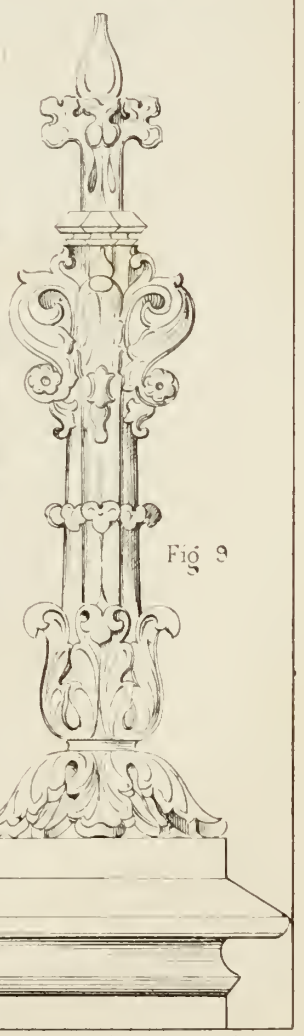


Fig. 9.

Scale 1/2 inch to the foot

P. S. Duval's Steam lith. Press Philad.a

DETAILS.

A NORMAN VILLA.

DESIGN TENTH.

This Villa was designed originally for A. M. Eastwick, Esq., and is now nearly completed at a cost of about thirty thousand dollars. The interior decorations are of the richest description, and make it the most elegant residence perhaps in this section of country. Plate XXXIX. presents a perspective view of the design, the front elevation of which composes the frontispiece of this volume. The side and rear elevations will be found plates on XLIII. and XLIV., and all are drawn to a scale of one-sixteenth of an inch to the foot.

Plate XL. is the ground plans of the first and second story, with the dimensions of the different apartments laid down. The points marked F. P. and D. W. are the positions of the fire-proof closet and the dumb-waiter. In the second story the bath room communicating with the principal chamber to the right, is made with a half partition so as to admit light from above. In both bath rooms and the nursery, wash-bowls are to be arranged.

Plate XLV. exhibits the plans for the basement and attic stories. In the front bed-room of the latter are the stairs leading to the upper stories of the tower. In the passage leading to this room is a circular glass plate fixed in the floor for giving light to the hall below, received from the sky-light in the roof above. The furring-off is shown in the different chambers.

Plate XLI. is of details. Fig. 1, outside dressings of the twin windows of the chambers over the parlor and drawing room. Fig. 2, outside dressings of the side window of the chamber over the dining room. Fig. 3, bay window of the parlor and drawing room. Fig. 4, bay window of the dining room. Fig. 5, window sills, &c.

Plate XLII. is of details. Fig. 1, finial of the front porch. Fig. 2, front porch and front door beneath. Fig. 3, cornice cap, post and base of the arcades. Fig. 4, cap of the front porch enlarged.

Plate XLVI. is also of details. Fig. 1, balcony over the front porch. Fig. 2, side view of the same showing the bracket. Fig. 3, chimney, gable cornice and corbel. Fig. 4, cornice of the tower. Fig. 5, section of the front porch post. Fig. 6, design for an interior corbel. Figs. 7 and 8, designs for interior caps. Fig. 9, finial of the tower.

SPECIFICATION

Of the workmanship and materials to be used in the erection of a Norman Villa, designed for A. M. Eastwick, Esq., Bartram's Gardens, on the west bank of the Schuylkill, near Philadelphia.

EXCAVATION.—The cellar is to be, throughout the entire extent of the building, including all appendages, ten feet deep below the level of the principal floor. The trenches for foundations are to be at least eight inches deep below the cellar bottom. Excavate also all areas, drains, cess-pools, &c., required by the plans, and a well beneath the octagonal tower to the water gravel. The earth from the said excavations is to be graded around the building as high as the intended line of ground level and rammed quite hard. All superfluous earth is to be removed from the grounds, or be placed where the owner may direct.

MASONRY.—All the exterior walls of the basement story are to be composed of quarry building stone of the best quality. The foundations are to be of large flat stone, well and solidly bedded in mortar. The walls must be well flushed in mortar of the best and most approved compound of sharp sand and well burnt lime, and grouted every two feet if the material used be of an absorbent quality.

The foundations of the main tower are to be three feet thick to the level of the cellar floor and from thence two feet nine inches thick to the first tier of the joists. The foundations of the octagon tower are to be two feet six inches thick to the level of the cellar floor, and from thence two feet three inches thick to the first tier of joists. The foundations of the exterior

walls of the building are to be two feet three inches thick to the level of the cellar floor, and from thence two feet thick to the first tier of joists. The foundations of the conservatory, the arcades and the areas, are to be two feet thick to the level of the cellar floor, and from thence twenty inches thick. The foundations of the front porch must be of sufficient thickness to receive the granite plinths for the clustered columns.

CUT-STONE.—The steps and plinths of the front porch, the steps, sills and plinths at the side, the sill of the kitchen door, the steps and sill of the rear entrance, the base-course and water-table around the building, are all to be of the best Connecticut granite, neatly tooled and completed as set forth in the working drawings which describe minutely the form and mode of finishing.

BRICK-WORK.—All the walls of the superstructure are to be composed of the best burnt bricks. The exterior course is to be of hard brick, no soft brick coming within four inches of the face of the wall, and the mortar is to be removed from all the exterior joints at least half an inch deep from the surface. The walls of the first and second story of the main tower are to be eighteen inches thick and the wall above thirteen inches thick. The walls of the first story of the octagon tower are to be eighteen inches thick, and the remainder thirteen inches. The walls of these towers must be grouted every fifth course. The exterior walls of the buildings are to be fourteen inches thick to the roof, with a hollow space one inch and a half wide, in the middle between the inner four inch course and the body of the wall, the two being tied together by making every fifth a heading course.

All the divisions in the basement, which according to the plan exceed nine inches in thickness, are to be thirteen inches thick and composed entirely of the best hard bricks, well laid. In the apartments marked "cellar," the walls are to be flushed with white mortar, and the walls of the others are to be faced for plastering. The division walls in the first and second stories are also to be of good brick-work nine inches thick. All bond timber, lintels, &c., throughout the building are to be properly bedded in mortar. The principal openings of the interior are to have arched heads. The openings for the bay-windows are to have strong lintels with arches concealed in the wall above. Construct a fire-proof closet in the library according to the usual method, with a soap-stone head and sill, and iron doors.

In the furnace cellars, two cases located as on the plan are to be bricked up with two walls each of single thickness, with a hollow space, four inches wide between. The sizes of these cases are delineated on the plan.

The flues for heating and ventilating the building must be arranged in such a manner and in such places as is required by the plans, or as may be hereafter directed. They are to be of brick, and those for the escape of gas must be well pargetted and topped out as shown in the detail drawings.

A culvert for drainage, eighteen inches in diameter, is to be constructed of brick below the cellar depths extending to the nearest point of the river. All necessary brick-work for the construction of other drains, cess-pools, is to be performed as the owner may desire. The sides of the well beneath the tower must be walled with one course of hard brick.

The mortar for all the above work must be the best and most approved compound of clean sharp river sand and well burnt fresh lime, in such proportions as will insure the strongest and most durable cement.

CARPENTER-WORK.—In the basement story the passage, store room, laundry, kitchen, servants' hall and tool room are to have floor joists three by six inches of white oak, firmly bedded in good concrete composed of stone chips and gravel mortar. The joists of the principal floor are all to be three by twelve inches, of spruce pine. Those of the second and attic floors are to be three by ten inches, and of hemlock. All are to be placed sixteen inches between centres, to have one course of herring-bone bridging through the centre of each tier, and are to have three-fourths of an inch crown.

The wall plates at the foot of the roof, and those for the gable timbers to rest upon, are to be three by nine inches, and to project two inches from the face of the wall. All bond timbers and lintels are to be provided when and where required of sizes suited to their purposes.

The rafters for the roof are to be of the usual cut and three by eight inches, those in the vallies being three by ten inches, and those for the flat over the hall three by nine inches. All are to be placed sixteen inches between centres and to be closely sheathed. The whole of this roof is to be framed according to the working drawings provided for the purpose. Provide all necessary bolts, straps, spikes and other material necessary to complete the work for the slater. The rafters for the roofs of the arcades, conservatory and other flats, are to be mere continuations of the floor joists, prepared for tinning. The roof of the main tower is to be of strong plank, properly curved, firmly secured to the wall plates, sheathed and covered with the best cedar shingles in diamond pattern. Each side of this roof is to have a dormer window as on the elevations. All other dormer windows are also to be constructed according to the elevations.

All requisite studs for partitions are to be three by four inches except those next doors, which must be three by six inches. Provide all necessary furring-out from the rafters to the floor, for the sides of the attic rooms, wherever delineated upon the plans, with studs three by four inches. Place all studs sixteen inches between centres.

OUTSIDE DRESSINGS.—The cornices of the eaves and gables are all to be constructed as set forth on the elevations and other working drawings which exhibit their peculiar form and mode of finishing. Reference is to be made to these drawings for the completion of the porches, arcades, conservatory, doorways and all other outside dressings. The carved

work is of wood painted and sanded. The clustered columns of the front porch and arcades, and those of the bay-windows and conservatory are of heart pine turned and placed as exhibited by the drawings.

FLOORS.—The floors in the basement and principal story are to be composed of boards four inches broad, when laid, and one inch and a fourth thick. Those of the second and third stories are of the same width, and one inch thick. All are to be of the best Carolina heart pine, mill-worked, well seasoned, firmly nailed to the joists and afterwards smoothed off. The attic floor need not extend beyond the furring out. The floors of the second and third stories are to be deafened by nailing cleats to the joists four inches from the edge, flooring them over and filling the space with mortar flush to the edge of the joists. The floors of the arcades, &c., are to composed of white pine boards, one inch and a quarter by four inches. They must be well laid with white-lead in all the joints. The ceilings of the same are to be lined with half inch white pine boards, quartered, grooved, leaded and neatly smoothed off for painting.

STAIRS.—The main stairs are to be of one and a quarter inch heart step boards of yellow pine, best quality, with one and a quarter inch white pine risers, placed upon four three by twelve inch bearers of hemlock. The newel is to be ten inches at the base, with a richly carved shaft, the balusters are to be three inches at the base, and also richly carved, the rail is to be two and a half by five inch moulded, and all are to be of black walnut. The private stairs leading from the basement to the attic, are to have turned balusters and newel of a smaller size, but in all other respects they are to be similar to the main stairway. The whole of the work must be executed in a firm and workmanlike manner.

DOORS.—The front entrance doors are to be of double thickness, making two inches and a half in all, put together with two inch screws. They are to be paneled, moulded and richly ornamented, as shown by the drawings. They must be hung with five by five inch silver plated butts, the joints being bushed with steel. The lock is to be eight inch, upright, mortice rebate, with ornamented porcelain furniture and night key. The doors are to be further secured by two iron plate flush bolts with porcelain knobs, the one at the bottom being ten inches long, and the one at the top three feet six inches. The door opening into the parlor from the vestibule, is to be two inches thick, and finished like to the front doors, except that the butts are to be four by five inch and the lock four inch. Provide also two sets of sliding doors for the openings from the drawing-room to the hall and to the dining room. They are to be two inches and a half thick, constructed, finished, and in the same manner as the front doors. All are to have arched heads.

All other room doors throughout the first story are to be two inches thick and the closet doors are to be one inch and a half thick. They are all to have arched heads and must be paneled and moulded, with ornaments in the panels. The room doors are to be hung with four by four inch silver plated butts and secured by locks with ornamented porcelain furniture. The closet doors are to be hung with three by four inch plated butts, and secured with three and a half inch locks with porcelain knobs. The doors throughout the second story are to be entirely similar to those in the first story, except that they have plain butts and are without the panel ornaments. The room doors in the attic story are to be one inch and a half thick, the closet doors are to be one inch and a quarter thick, and all are to be otherwise similar to those in the second story, except that the panels are to have no mouldings.

The entrance doors to the kitchen must be two inches thick and hinged with four by four inch butts and secured with a six inch mortice lock, and two six inch iron plate flush bolts. The other room doors throughout the basement are to be one inch and a half thick, hung with three and a half by three and a half inch butts, and secured by suitable locks. All closet doors must have locks and be finished similar to those in the attic.

WINDOWS.—All windows are to have arched heads and must be finished according to the working drawings. Provide inside shutters to those of the basement, first and second stories, made in the requisite folds, one inch thick, paneled, moulded and otherwise finished in the best manner. All sash, except those of the dormer windows and octagon tower, are to be one inch and three quarters thick, and double hung with axle pullies and patent cord. Those of the conservatory are to have one sash each, so arranged as to descend into the basement. The sash of its roof are to be arranged as to open easily with cord and pullies.

INSIDE DRESSINGS, &c.—The skirting of the parlor, hall, drawing room and dining room must be fourteen inches wide, including the sub and moulding. That of the other rooms in the first story and of those in the second story, are to be twelve inches wide and of a similar finish, and all other skirting must be seven inches wide, including a one and a half inch moulding. All other dressings are to accord with the drawings.

There is to be a plank reservoir, strongly bolted, and of 1500 gals. capacity, placed in the square tower near the ceiling of the fourth story; also one similar in the third story of the octagon story, having a capacity of 800 gals. The reservoirs referred to are in Mr. Eastwick's house, made of boiler iron, strongly riveted and painted.

The closets are all to be fitted up with shelves, hooks, &c., as may be directed. There must be a dumb waiter arranged at the point marked on the plans D. W., with cords, pullies and weights, so as to move readily between the basement and first story.

PLASTERING.—All walls and ceilings of the building are to receive two coats of brown mortar, and one of white hard finish. All studding is to have lath free from bark securely nailed. There is to be a cornice in the vestibule, hall, parlor,

library, drawing room, dining room and principal chambers, executed and finished according to sectional detail drawings provided for the purpose. There are to be centre pieces in the same rooms of the first story of an agreed size and pattern.

ROUGH-CASTING.—All the exterior walls must be well brushed, to remove dust and loose mortar, previous to rough-casting, and be kept well saturated with water during the progress of the work. The materials are to be of the very best quality, the sand being well-washed before using. The whole is to be laid off into blocks, tinted to represent stone.

SLATING.—All the roof of the building except the flats is to be overlaid in diamond pattern with the best purple Welsh slate of a large size. Each slate is to be secured with two copper nails, and the whole pointed beneath with strong hair mortar, to exclude the driving rain and snow.

TINNING.—All flues for heated air are to be cased in tin. All flats, vallies, flushings, and the roofs of the octagon tower, arcades, and bay windows, must be overlaid with the best one-cross roofing tin, painted on both sides, the upper receiving two coats. Provide also all necessary gutters, conductors, &c., of the best tin.

LIGHTNING-RODS.—There is to be a lightning rod placed against the main tower. It must descend at least six feet below the surface, be properly secured to the wall, ascend at least six feet above the roof of the tower, and finish with a platinum point, costing not less than four dollars.

TILES.—The vestibule, kitchen and conservatory are to be floored with English tiles; the pattern of the first being red buff and black with a centre of encaustic tiles in five colors; that of the second being red and black; and that of the third being black and buff.

BELLS, &c.—There are to be twelve bells with wire pulls and six speaking tubes arranged in such parts of the building as the owner may direct. The bell pull of the front door must be of ornamented porcelain.

MANTLES.—There must be a mantle placed in the drawing-room at a cost not less than $150, one in the parlor and dining room at $100 each, one in the library at $50, one in the office at $30, and two in the principal chambers at $40 each. The patterns are to be selected by the owner.

PAINTING AND GLAZING.—All the wood-work of the interior that it is usual to paint, must have two coats of pure white-lead mixed with linseed oil, tinted as may be directed. The rail, &c., of the stairs is to have four coats of the best varnish. All exterior wood-work, except the floors, must either be painted and grained in imitation of oak, or in imitation of stone, and sanded as may be directed.

All the sash are to be glazed with the best American glass, well bedded, bradded and back puttied.

PLUMBING.—The reservoirs supplied by force pumps are to be lined with sheet lead weighing three lbs. to the square foot, and the bath tubs with lead weighing five lbs. Arrange water-closets in the first three stories of the octagon tower, with china bowls and a soil pipe connecting with the well beneath. Provide china wash basons in each of the bath rooms and in each of the principal chambers. The above must be supplied with water from the reservoirs by pipes extra strong. All necessary waste pipes must also be provided. Water must also be conveyed to the sink and range in the kitchen, and conveyed from the boiler thence wherever required. All necessary stop-cocks must be provided, those in the chambers being silver plated. The whole must be executed in the best manner and every thing furnished to make it complete.

COOKING RANGE.—A large sized cooking-range must be placed in the kitchen, with water back and a circulating boiler attached. It must be of the best and most approved construction.

FURNACE, &c.—Place one of Fox's and one of Chilson's No. 5 furnaces in the cases prepared in the cellar. The register in the drawing room is to be ten by sixteen inches, that in the hall nine by fourteen inches, those in the parlor, library and office, eight by twelve inches, and that in the dining room nine by fourteen inches. There are to be eight in the second story eight by twelve inches each. Those in the drawing room, dining room, hall and parlor, must be silver-plated, all others must be enameled.

FINALLY.—All the above work must be executed and completed in the best workmanlike manner, according to the general intent and meaning of this specification, and in all parts, not herein described, according to the working drawings; the work being subject at all times to the decision of the Architect.

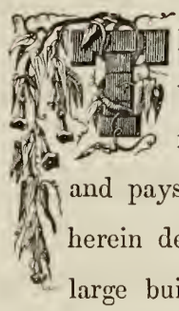
DESIGN FOR A CEILING.

Upon the opposite page we present a design for a ceiling. It may be executed either in stucco or fresco, but in the latter case the principal panels must be retained in order to aid the effect of the painting. The details of this design together with an extended account of this kind of decoration will be given in another part of the work. The proportions are four by six.

Des^d by Sam^l Sloan Arch^t

DESIGN FOR A CEILING.

THE CONTRACT.



THE working drawings, specification, and bill of quantities, are examined by the contractor, who then makes his estimate and bids for the work. The successful bidder enters into a formal contract with the projector who, as a general thing, submits to him the whole work and pays for it by instalments. This is the usual and best arrangement for such buildings as are herein described, but sometimes parts of the work are performed under separate contracts. For very large buildings, such as heavy public works, many other arrangements are necessary, but we refer only to such as are within our limits. The minutiæ of an agreement are varied by different circumstances, and being innumerable, we cannot comprise them here. We simply insert a usual form of contract, drawn up by a member of the Philadelphia bar, which may be relied upon for its accuracy. The italicised words must be changed in using.

ARTICLES OF AGREEMENT made this, the *first day of December*, Anno Domini, one thousand eight hundred and *fifty-one*, by and between RICHARD ROE, of *the city of Philadelphia and State of Pennsylvania, Merchant*, of the first part, and JOHN DOE, of the *city of Camden and State of New Jersey, Builder*, of the second part, as follows, viz:—

The said party of the second part, for and in consideration of the covenants and agreements hereinafter mentioned, doth for himself, his executors, administrators and assigns, covenant, promise and agree to and with the said party of the first part, his executors, administrators and assigns, that he the said JOHN DOE, shall and will, within the space of *nine calendar months* next ensuing the date hereof, to wit: on or before *the first day of September*, Anno Domini, one thousand eight hundred and *fifty-two*, in good and workmanlike manner, and according to the best of his art and skill, well and substantially erect, build, set up, and deliver to the said party of the first part, or his legally authorized agent, free and discharged of all claims, liens, and charges whatsoever, or cause to be erected, built, set up, finished and delivered as abovementioned, on a lot or piece of ground, situate and being, (here insert the description as contained in the deed, and designate the part of the lot the house is to occupy,) one house, messuage or tenement, according to the plan, draft or scheme, with specifications annexed, made, drawn, and furnished by SAMUEL SLOAN, Architect, the contents whereof are as follows, viz:—(here insert the plans, &c., or refer to them by numbers or letters, and affix them to these articles, as in case of difficulty under the contract, they alone can decide.) And the said party of the second part further agrees, for himself, his executors, administrators and assigns, to furnish, at his own proper cost and charge, all the materials which may be requisite for the construction of the aforesaid house, messuage or tenement, according to the plans and specifications aforesaid; and to ensure on his part the performance of this part of these presents, it is further agreed, that JOHN WHITEACRE, of the city of Philadelphia, Carpenter, be and the same is hereby appointed superintendent, who shall

have power to inspect, and accept or reject any work done, or materials it may be proposed to use in or about the construction of the house aforesaid, and whose decision shall be final and conclusive, as between these parties.

And the said RICHARD ROE, the party of the first part, as aforesaid, in consideration of the above premises, doth for himself, his executors, administrators and assigns, covenant, promise and agree, well and truly to pay, or cause to be paid unto the said party of the second part, his executors, administrators or assigns, the sum of *Eight Thousand Dollars*, good and lawful money of the coin of the United States, in three several payments, in manner following, to wit:—

On the first day of *March*, Anno Domini, one thousand eight hundred and *fifty-two*, or as soon thereafter as the walls shall have been completed, the sum of *Two Thousand* Dollars.

On the first day of *April*, Anno Domini, one thousand eight hundred and *fifty-two*, or as soon thereafter as the floors shall have been laid, the partitions set, lathed and scratch coated, the sum of *Three Thousand* Dollars.

On the first day of *September*, Anno Domini, one thousand eight hundred and *fifty-two*, or as soon thereafter as the building aforesaid, shall have been delivered as aforesaid, the sum of *Three Thousand* Dollars.

And it is further agreed between the aforesaid parties, that all alterations of the annexed plan and specifications, by which the costs of building may be either increased or diminished, shall be endorsed on these articles, and signed by the parties, before they shall be deemed binding on either party.

And for the performance of all and every the articles and agreements abovementioned, the said RICHARD ROE and JOHN DOE, do hereby severally bind themselves, their executors, administrators and assigns, each to the other, in the penal sum of *Ten Thousand Dollars*, good and lawful money as aforesaid, firmly by these presents.

In witness whereof, the said parties have hereunto set their hands and seals, the day and year aforesaid.

SIGNED AND SEALED
IN THE PRESENCE OF
SAMUEL WILLIAMS,
THOMAS RICHARDS.

RICHARD ROE, ******* * SEAL. * *******

JOHN DOE. ******* * SEAL. * *******

For the faithful performance of all and singular the covenants, agreements and promises, contained in the above articles, on the part of JOHN DOE, the party of the second part aforesaid, we do hereby jointly and severally bind ourselves, our executors, administrators and assigns, to the aforesaid RICHARD ROE, his executors, administrators or assigns.

Witness our hands and seals, the day and year aforesaid.

SIGNED AND SEALED
IN THE PRESENCE OF
SAMUEL WILLIAMS,
THOMAS RICHARDS.

JAMES SMITH, ******* * SEAL. * *******

RICHARD JONES. ******* * SEAL. * *******

The above contract is complete, and may readily be adapted to suit circumstances. Great care, however, must be exercised in making alterations or additions, as a false expression might render the whole invalid. In the appointment of a superintendent or referee, other articles must be signed by him and the parties, binding him for a consideration to the faithful discharge of his obligations. Most frequently this appointment is superfluous, the work being inspected by the owner in person. It is only in

case the work be at a distance or so extensive as to require constant attendance, that the owner need make the transfer. If there are any reservations made by either party, they should be endorsed upon the articles of agreement. The security of the party of the first part is in the same form as that given, the names of the parties being reversed. When the work is complete, it is essential that the owner receive a release "of all claims, liens, or charges whatsoever," signed by each and every person who either may have furnished material for the building, or who may have done any labor in its erection; otherwise, after the business between himself and the contractor be finally closed, he may be compelled to liquidate claims which the other has failed to discharge.

The business of entering into and fulfilling such a contract is by no means easy, and inexcusable carelessness in this is the cause of innumerable lawsuits. By using the above form, and exercising judgment and care in its adaptation, no difficulty need be apprehended.

A PLAIN AND ORNAMENTED VILLA.

DESIGN ELEVENTH.

Two front elevations of this design are presented on plates XLVIII. and XLIX. They are spoken of as the same design, because their breadth, depth, and general features are similar, and the same floor plans are used for both. The first of these elevations is quite plain, being almost destitute of ornament, but at the same time so finished as to avoid a barren appearance. The second on the other hand is highly ornamented, and a half story higher than the first, thus giving a commodious garret, the circular windows of which may be seen over those of the second story. The observatory of this elevation is covered, and might be arranged without a floor, so as to give additional light and ventilation to the garret rooms. The garret or loft is approached in each by a flight of stairs, over those leading to the second story. The cellar door is beneath the main stairway, and the windows are on the sides of the building. The elevations are drawn in a scale of ten feet to the inch. The design is best adapted to a village or suburban dwelling. We have presented the extremes of plainness and decoration, so that any desirable medium may be attained.

On plate L. are the floor plans of the design. The house is intended to be warmed either by stoves or by a furnace beneath the hall. The flues for heated air are in the cross partitions, and the gas flues are at the sides of the building, giving a sufficient breadth of projection for mantles. The recess in the dining room, next the vestibule, is a convenient situation for a sideboard. The parlor and library are separated by sliding doors. It would be as well, perhaps, to reverse the steps and have them begin against the rear wall, thus presenting a better appearance from the hall. A convenient back porch might be placed in the rear or at the side of the kitchen, which might be built two stories high, and thus give an additional chamber. The two windows of the first and second story, in the rear of the stairway, serve to admit more light to the passage below and the hall above, but might be dispensed with.

Plate LI. is of details. Fig. 1, is the cornice, eave ornaments, &c., of the ornamented front. Fig. 2, details of the porch and front door. Fig. 3, section of the same. Fig. 4, front window, with a section beside it of double size. Fig. *a*, section of the architrave of the front door. Fig. *b*, section of the front door lintel Fig *c*, section of the door rail.

Plate LII. also consists of details. Fig. 1, observatory of the ornamented front. Fig. 2, section of the same. Fig. 3, observatory of the plain front. Fig. 4, cornice of the same. Fig. 5, section of the cornice. Fig. 6, details of the front porch. Figs. 7, 8, and 9, a design for a mantel.

The first story of this design is twelve feet and eight inches from floor to floor, and the second story is ten feet in the clear. The cellar, throughout the entire extent of the main building, is eight feet deep in the clear, and the trenches for the foundations are at least six inches deep below the cellar bottom, and those for the porch and kitchen are two feet deep.

The walls of the cellar are eighteen inches thick, and those of the first and second stories are sixteen inches thick. The foundations of the kitchen and porch are also sixteen inches thick. All are composed of good quarry building stone and the best mortar. The foundation course is large flat stone solidly bedded in mortar. All facings are smooth-dashed, and those of the cellar lime-washed. All gas flues are of brick well pargetted. There are two cross walls of brick in the cellar, immediately beneath the main partitions above, having arched openings.

The kitchen is framed and closely boarded, for painting and sanding, to appear like the walls of the main building. It also might be built of stone or of brick, but this would increase the cost of the whole.

The joists of the first floor are three by twelve inches, of spruce pine. Those of the second are three by eleven inches, of hemlock. Those of the third are three by ten inches, and also of hemlock. Those of the porch floor are three by nine inches, and those of the ceiling are three by five inches. All are placed sixteen inches between centres. The side rafters are three by five inches, and the hip rafters, with the framing rafters at the corners, are three by ten inches. They are placed two feet between centres, and are closely sheathed for tin. The wall plates and the ridge piece are three by twelve inches. The doors and windows are to have lintels six by six inches, extending nine inches into the walls.

The floors within are of Carolina heart pine, and that of the porch is of white pine, laid with white lead in the joints. The washboard of the first story main building is eight inches wide, with a three inch sub and two inch moulding, that of the second is six inches wide, with a sub and moulding, and that of the kitchen is four inches wide, with plain moulding.

The window frames of the main building are all similar in construction, having sash one inch and a half thick, double hung. Those of the first story have paneled shutters, and those above have pivot blinds, both being one inch and a half thick, and hung with strong hooks and straps. The front doors are two inches thick, and all other doors below are one inch and three-quarters thick, except the closet doors, which are one inch and a half thick. The room doors of the second story are one inch and a half, and those of the closets are one inch and a quarter thick. All knobs in the first story are of white porcelain, and those in the second are mineral. The window and door dressings in the first story are six inch diminished pilasters, with a two and a half inch moulded band. The windows above have plastered jambs.

Beside the usual plastering, the parlor, hall, library and dining room have appropriate cornices and centre flowers. All the exterior of the main building is to be rough-cast, tinted and pointed. The roofs of the main building, porch and kitchen are tin, painted on both sides, the upper receiving two coats. In all other respects the house is handsomely and completely finished, with various modern improvements.

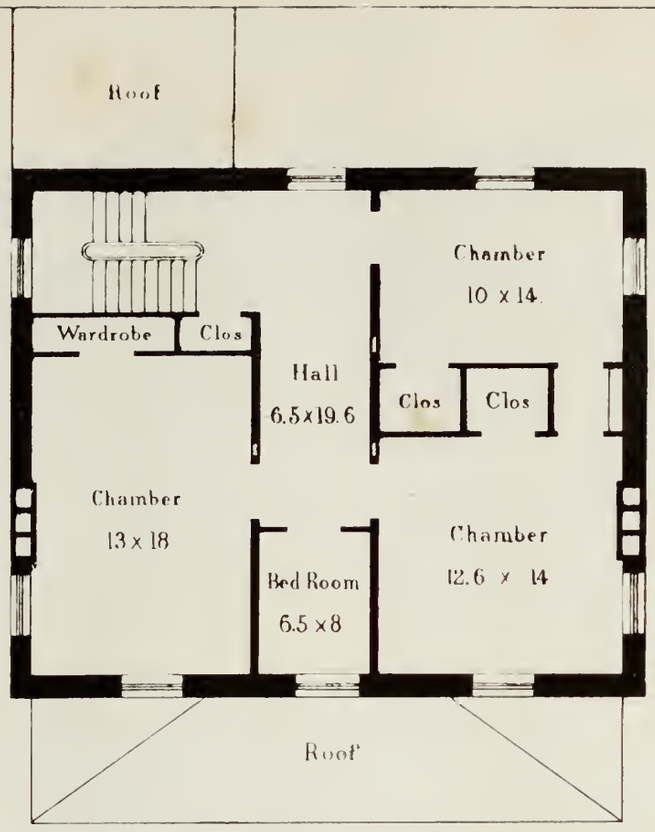
The cost of the building, with the plain front, as estimated from a bill of items, would be about $2500; the cost of the other would be $3400.

Sam[l] Sloan Arch[t] P S Duval's Steam lith press Ph

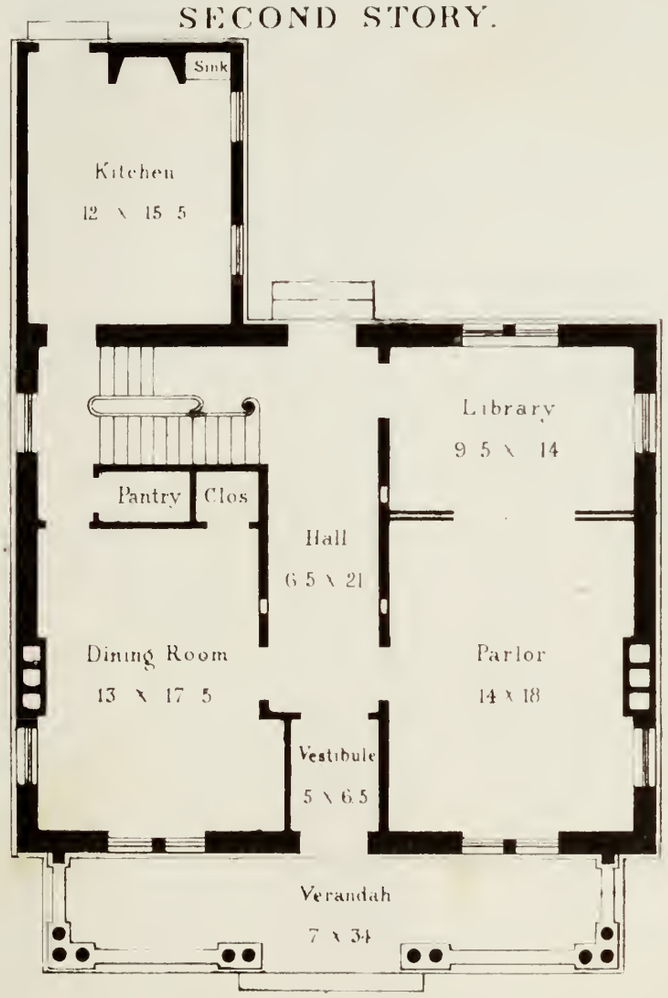
A PLAIN VILLA.

Sam[l] Sloan Arch[t] P S Duval's Steam lith

THE SAME ORNAMENTED.

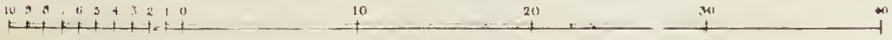


SECOND STORY.



FIRST STORY.

Scale 10 Feet to the inch



GROUND PLANS.

P. S. Duval's Steam Lith. Press Phila.

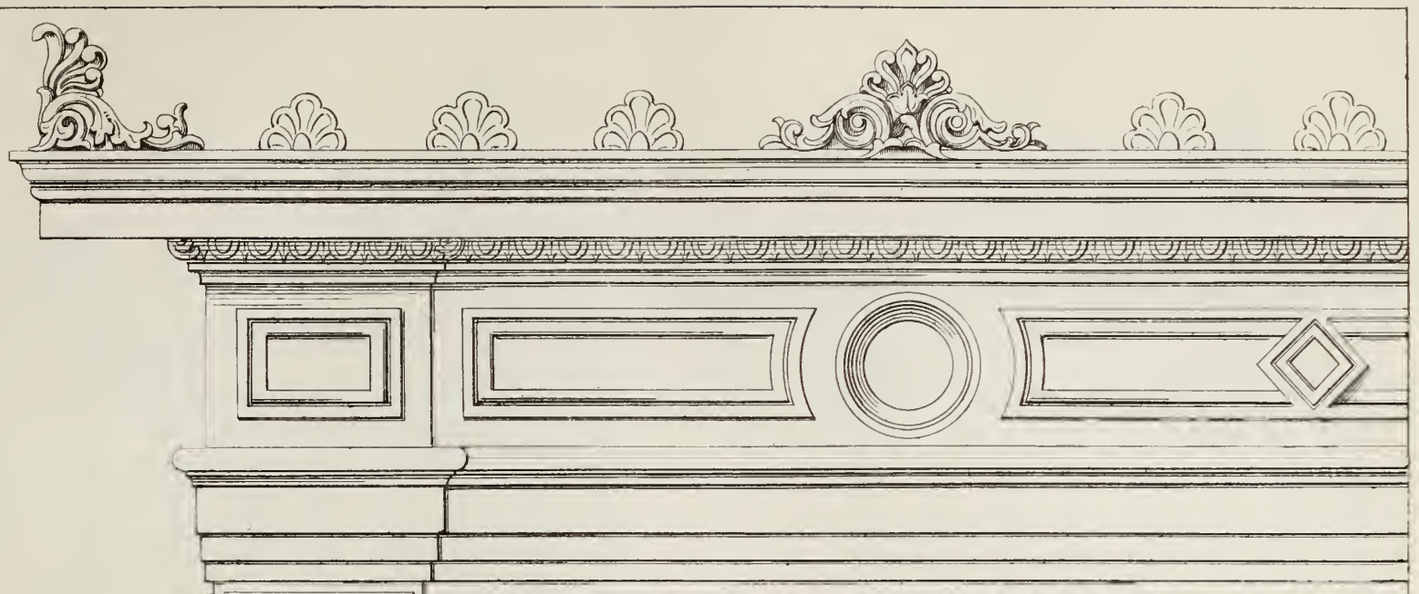


Fig 1

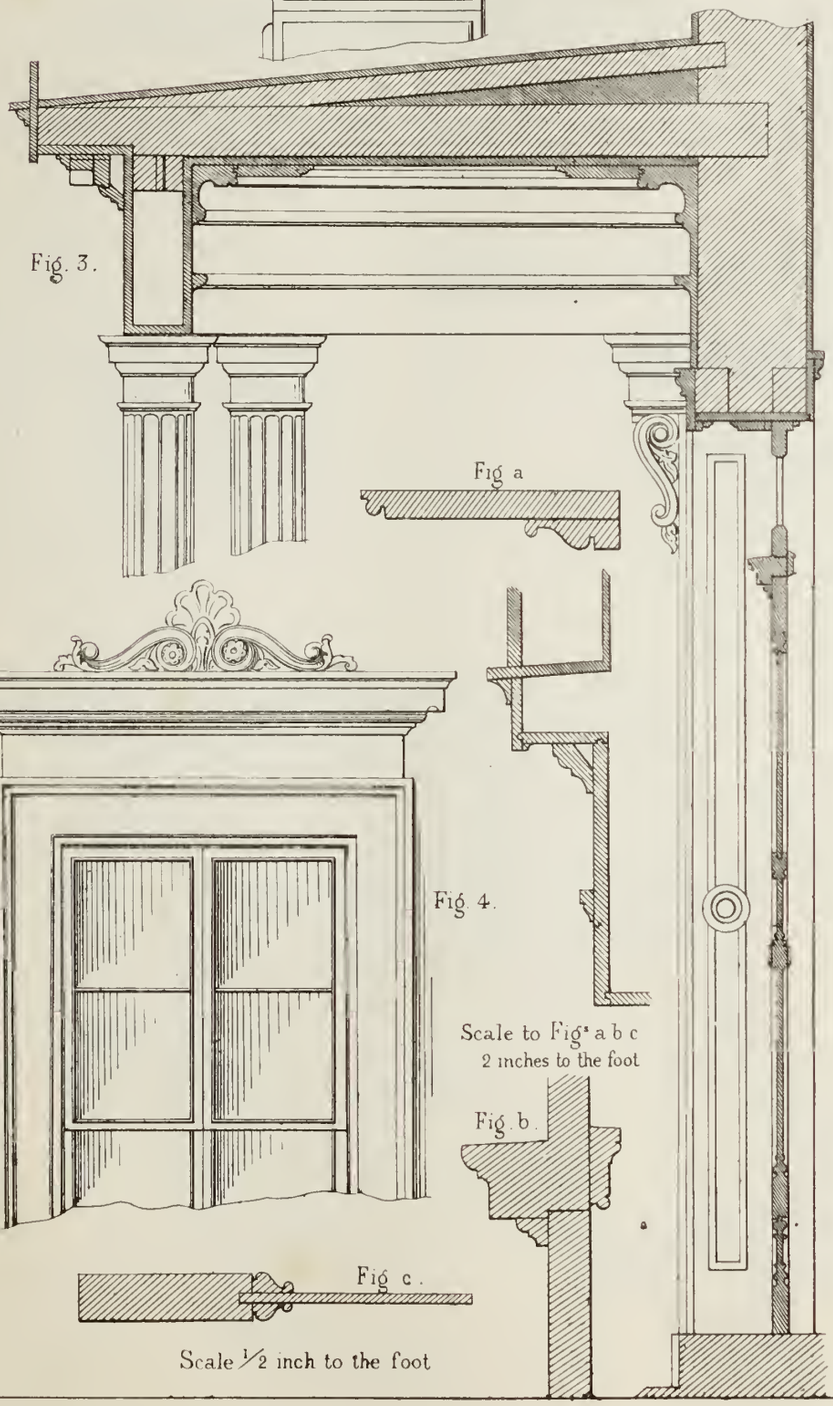


Fig. 3.

Fig a

Fig 4.

Scale to Figs a b c
2 inches to the foot

Fig. b.

Fig c.

Scale ½ inch to the foot

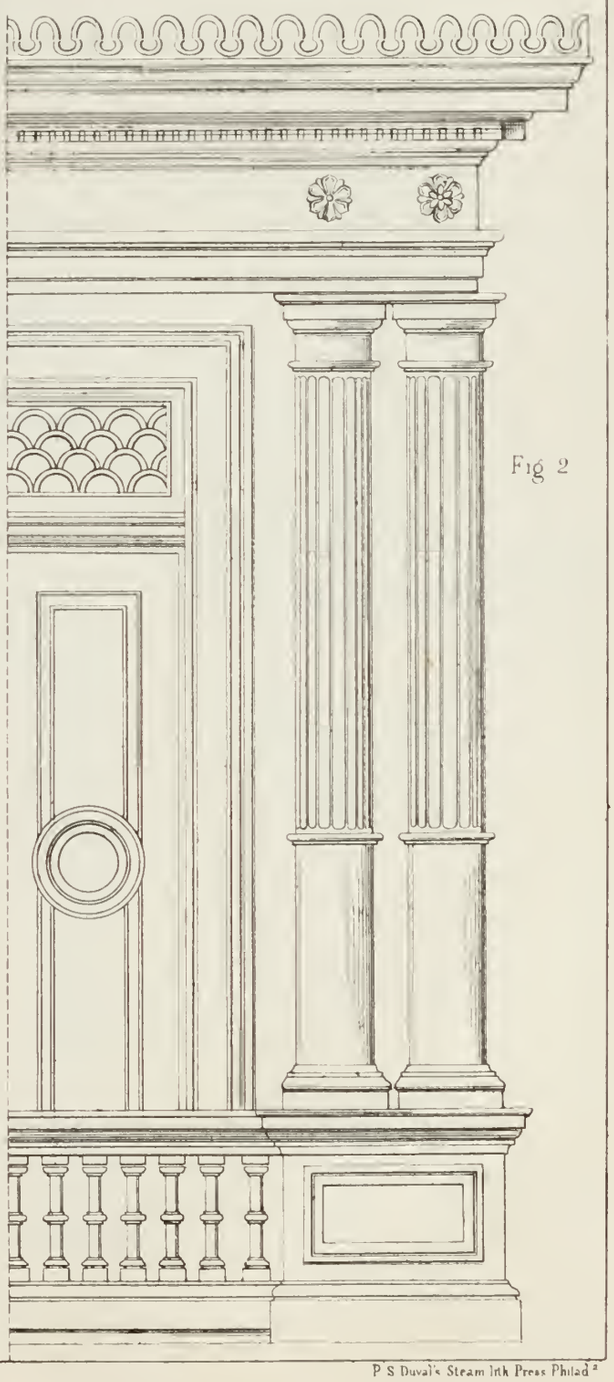


Fig 2

P. S. Duval's Steam Lith. Press Philad.a

DETAILS.

Fig 1

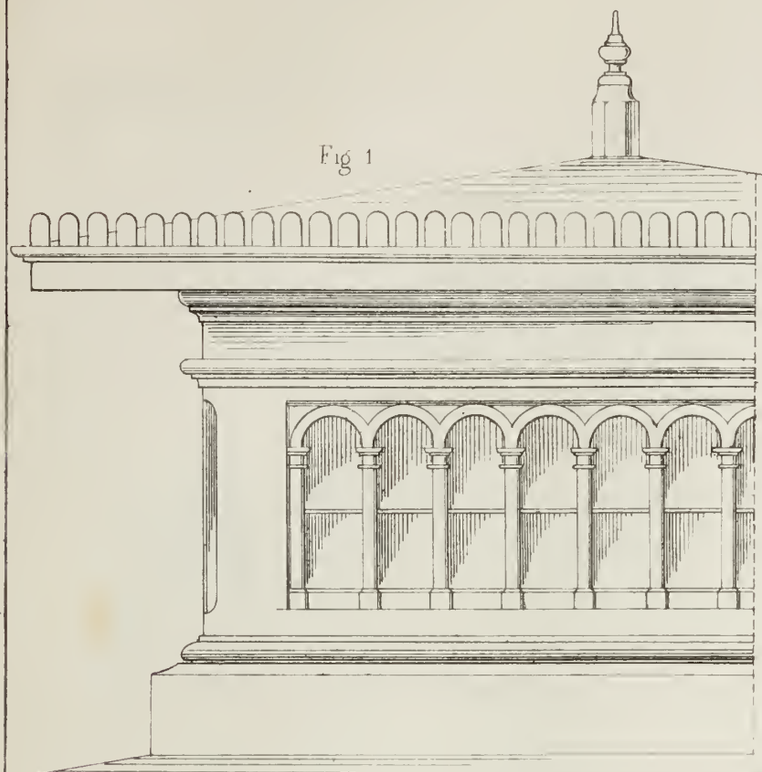
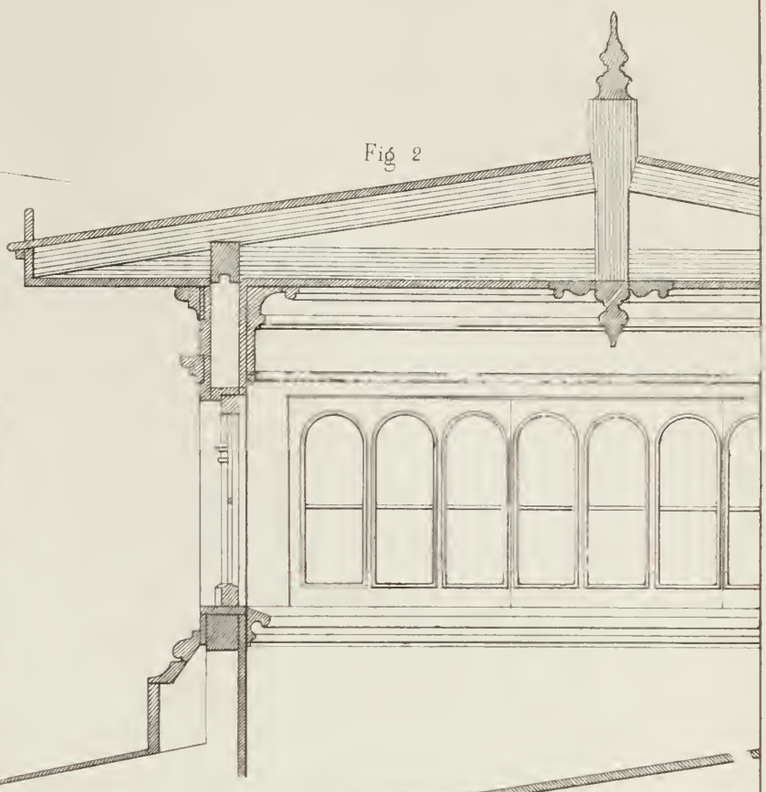


Fig 2



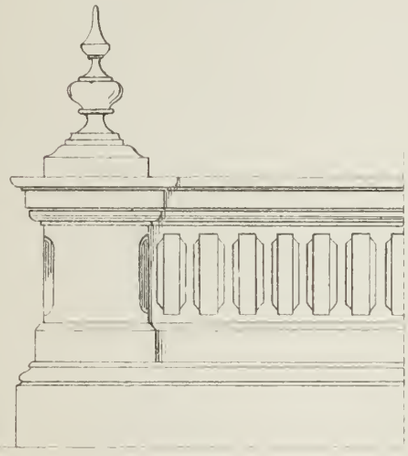


Fig 3

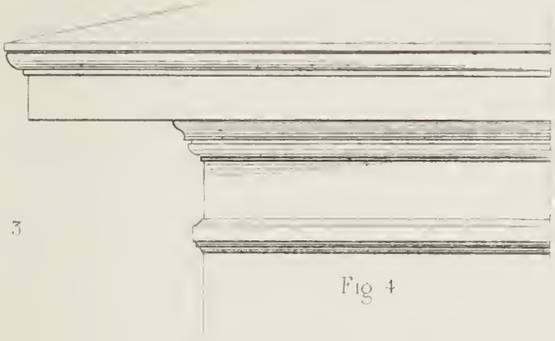


Fig 4

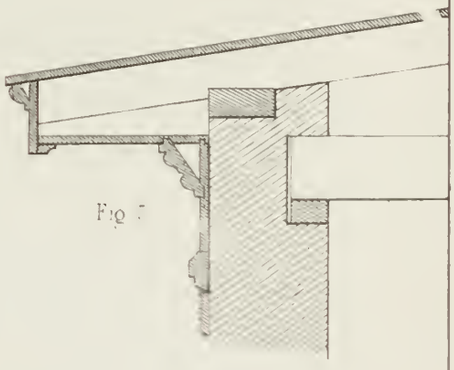


Fig 5

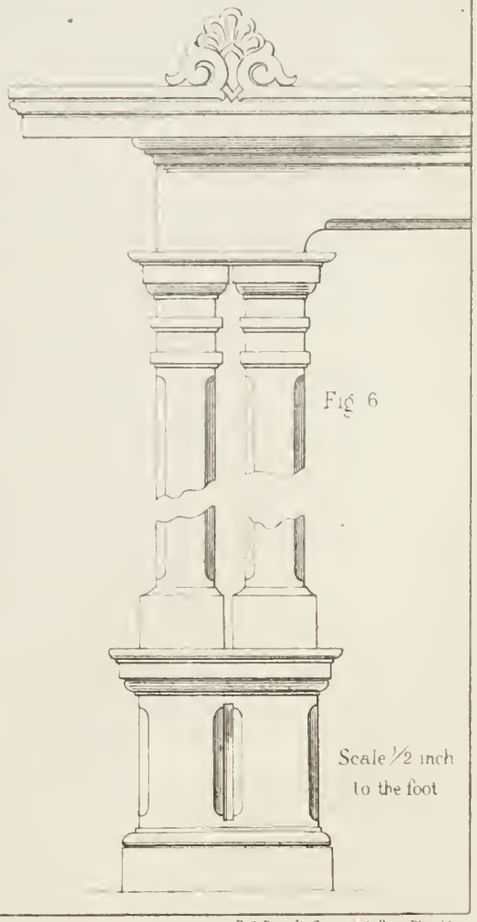


Fig 6

Fig 7

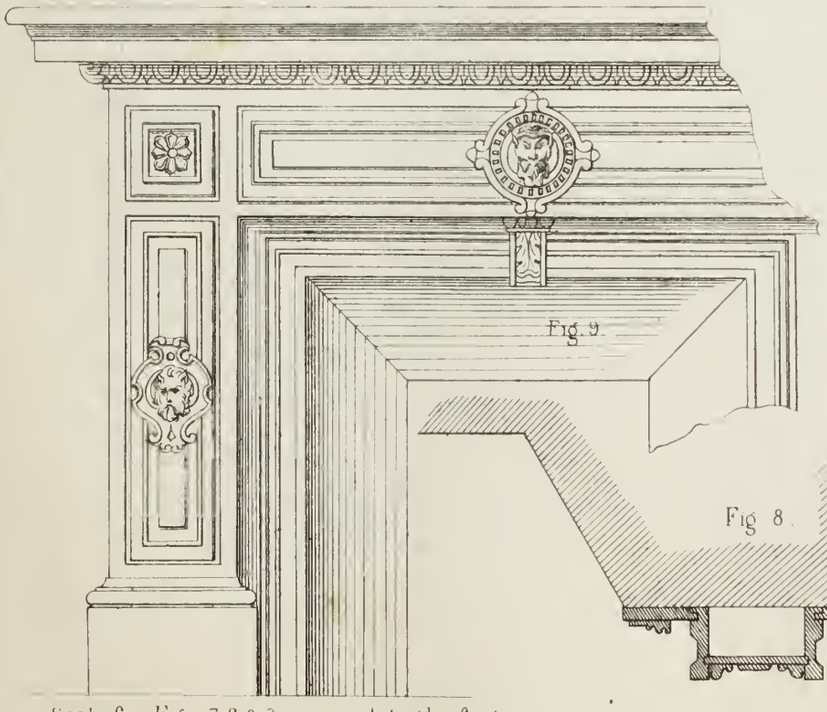


Fig 9.

Fig 8.

Scale for Figs 7 8 & 9, one inch to the foot

Scale ½ inch to the foot

P.S. Duval's Steam Lith. Press Phila.

DETAILS.

THE EXCAVATIONS.

A CELLAR well lighted and ventilated is a great convenience in any dwelling. It is sometimes finished as a basement story, and contains the kitchen, laundry, and store rooms. Outhouses are often used for these purposes, but even then, in this climate, a cellar is almost indispensible. At the present day dwellings are warmed by heated air, it being found the cheapest, as well as the most salubrious method, and the furnace for this purpose cannot be well placed elsewhere. The various apartments serve for the storage of fuel and vegetables, which are here secure from the effects of dampness and frost. Besides this, it brings the foundations upon deep, firm ground, and thus enhances the stability of the building. Many advantages may be obtained by building upon a declivity, and the excavation, for reasons mentioned hereafter, should always be, if possible, throughout the entire extent of the foundation.

The greatest objection to cellars, or basement stories, is the damp to which they are usually subject. It is best to examine well the contour and nature of the grounds before excavating, to avoid earth constantly wet, and springs, which are a source of great trouble when once opened. Unless there be some such extraordinary cause, there need be no dampness whatever. The cellar walls may be so constructed or coated as to be quite impervious. This object may be attained more perfectly by also laying the pavement in hydraulic cement, or, if the cellar be floored, the sleepers should be bedded in concrete, thus preserving them from moisture and rot, which is at once disagreeable and unwholesome.

In preparing trenches for the foundations much care is requisite. If the building be without a cellar, they should be so deep that the bottom will not be subject to the contraction and expansion caused by variations of temperature. But there are two things which, in all cases, are especially to be provided against,—the unequal settling of the superstructure, and the lateral escape of the support. It cannot be too much impressed upon the mind, that the object is not so much to prevent settling as that it may be uniform throughout the structure. If this last be the case then no evil consequences can ensue, but if this settling, which it is impossible wholly to prevent, be irregular, then the walls of the building will inevitably crack, and present those fissures, which impair both the beauty and the stability of the building. Hence the bottom of the trenches should be in the same stratum throughout, and the ground should be well examined before building, to see that it is a uniform and firm bed, or else it is impossible to avoid bad results. The bottom of the trenches should also be on the same level, if practicable, for when the

contour of the ground requires it to be 'benched out,' the unequal yielding cannot so certainly be prevented. It must also be kept in mind that not only does the support generally yield, but the walls themselves settle more or less. In the walls, the most settling occurs where there are the greatest number of mortar joints, and hence although the prime support may be perfectly firm, yet an irregular surface, giving the walls different heights, may cause them to crack. It is for this reason that the cellar had better be throughout the building, for otherwise the foundations will rest on different levels.

As might be supposed, the best support for a foundation is a bed of rock, but this is only the case where it has a level surface, either natural or artificial. The difficulty of obtaining a perfectly level bed of rock, and the expense of leveling it render this support infrequent; yet we cannot see why good concrete, composed of coarse gravel and a little lime, which when once set is entirely incompressible, might not be used for reducing all irregularities of surface, and form an excellent support for building. But, taking all things into consideration, perhaps the best support for a foundation is a uniform bed of compact gravel. Such a bed yields very little, and is not liable to be affected by air or moisture, and hence the excavation should be continued to such an one if it be attainable. Sand, which is incompressible would be equally good, were it not so easily affected by water, and therefore cannot be used with safety. Clay is very bad, as it escapes laterally, and is subject to great contraction and expansion. We sometimes meet in excavating a bed of shale, which, when first uncovered, is as hard as stone, but after a little exposure runs into sludge. This must be avoided if possible, but when it cannot, care must be taken to expose it but little, by covering it at once with concrete, and building immediately. Good firm earth forms an excellent support, but as it yields considerably it must be built on with care. By a judicious use of concrete, a good foundation may be secured in almost any situation, and it is an excellent practice to build the foundations as high as the first tier of joists, and let them remain in this state for a season before erecting the superstructure. They then have time to become firmly fixed, and any failing may be remedied before the other walls are erected.

The only other excavations of importance which are usually made about a dwelling, are for the conveyance and reception of refuse matter. The accumulation of filth about even the most cleanly dwelling, if there be no systematic and effectual plan for its removal, is such as to be not only in the highest degree unpleasant but also noxious. The usual way is to construct the privy distinct, at a short distance from the house, and to throw the offal of the kitchen into a vessel for subsequent removal, or to allow it to pass off in a surface gutter. In building with the modern improvements, however, the water-closet is generally placed within doors, over a well, into which the offal is also allowed to pass. The well, in this case, should always be excavated to the water gravel, which to a great extent, absorbs and carries off its contents. There are, however, many objections to this plan as experience has shown, and a little reflection will suggest. A much better way is to convey all offal through pipes to an underground drain, which conducts to a stream, cess-pool, or well. If a stream be near of sufficient size, it forms a ready and effectual

means of removal. But sewage of every description is a most excellent manure. It is of the greatest importance to a farmer, or to those who cultivate even small gardens, and hence should be preserved for the purpose. To effect this, it may be received in a cess-pool at a distance from the house, or better in a well, for the open pool is an unsightly, offensive and unwholesome object, but a well is not so when covered over deeply by soil. The well in this case also should be excavated to the water gravel, that the liquids may be absorbed. If, however, the manure be of the highest importance, as it would be to a farmer, the cess-pool lined with clay is perhaps better, for then the liquids evaporate, and the soluble matter, which is the most valuable, is retained.

It is important that the drain for the conduction of this refuse matter should be well constructed. The point of discharge at the foot should be carefully finished, and the head should have a good syphon, or other trap, which will allow of the free entrance of any matter, and at the same time prevent the escape of noisome gases. This drain should in all cases have a continuous fall of one inch in forty or fifty, so that the water may not remain in it, but descend with sufficient impetuosity to bear along all solid matter, and thereby prevent choking, by keeping the drain well washed. It should not be so small as to detain solid matter, nor again so large as to make a shallow stream, for then, in consequence of increased friction the stream is sluggish. A diameter of from four to six inches is amply sufficient to drain any ordinary dwelling. When other material can be obtained, it is not well to use bricks in the construction of a drain, for their roughness adds greatly to the friction of the descending matter, and in consequence of their permeability the earth adjacent becomes damp and offensive. The best and cheapest drains are made of earthenware pipes, glazed inside, which at once lessens the friction and renders them impermeable. They are in short pieces with socket joints, or of a conical shape, so as to fit each other, and are put together with a little cement. It is evident that any bends in such drains are to be avoided if possible. Altogether, this subject is one of the greatest consideration in the erection of a cleanly and comfortable dwelling, but does not, we think, always receive that attention which its importance demands.

A DESIGN FOR A COTTAGE.

DESIGN TWELFTH.

On Plate LIII. is presented the front elevation of a Cottage more simple and cheap than any preceding one. It is of frame work, vertically weather-boarded, the joints being cleated with narrow strips. Plate LIV. is numbered as the same design, because of its similarity in general features, and because the proportions are such that the same floor plan would apply to either. It is, however, without an attic floor, which the one above has, and in general is cheaper and plainer than the other. They are both in a scale of ten feet to the inch.

Plate LV. exhibits two sets of ground plans, which may be used interchangably for either of the accompanying elevations, the one on the right being the most simple. The other has a back building two stories high, thus rendering it necessary to light the hall up stairs by means of the front window. The stairs to the attic are immediately over the main stairway. The house may be warmed either by stoves or a furnace.

On Plate LVI. are the details. Fig. 1, finial and cornice, with a section of the gable in plate LIII. Fig. 2, Tudor flower. Fig. 3, section of the same. Fig. 4, cornice and eave ornament. Fig. 5, section of the same. Fig. 6, details of the front porch and door. Fig. 7, section of the door. Fig. 8, details of the front window. Fig. 9, gable window on plate LIV. Fig. 10, section of the same. Fig. 11, dormer window. Fig. 12, section of the same. Fig. 13, porch.

In the subjoined description reference is made to plate LIV. in connection with the smaller floor plan, for which also the cost is estimated in the bill of items. There is a cellar under the main building five feet deep from the natural surface of the ground. The cellar walls are of stone, sixteen inches thick and eight feet high, to the top of the first tier of joists. The joists of the first floor are three by twelve inches, those of the second three by ten inches, and placed sixteen inches between centres. The ridge piece is three by twelve inches, and the rafters are eight inches at the foot, of the usual rafter cut, and placed two feet between centres. The main sills are six by six inches, the corner posts and girts are three by eight inches, the plates are three by six inches, the studding and braces are three by four inches and sixteen inches between centres. The weather-boarding is all uniformly eleven inches wide, grooved together and the joints cleated, the cleats being narrow beveled strips terminating in pointed arched heads, as on the elevation. The whole exterior is painted with three coats of good paint in any desirable tint, then sanded and afterwards repainted. Otherwise, the house is finished in a plain and substantial manner, the usual arrangements in respect to construction being adopted throughout.

A FULL ESTIMATE

OF THE COST IN ERECTING DESIGN TWELFTH.

This estimate is made for the smallest elevation, in connection with the smallest plan of the two given above. The difference of cost between this and the other elevation and plan, would be about $550.

Excavation, 200 yds. @ 20 cts.	$40.00
Stone, 91 perches @ $2.00, lime and sand included,	182.00
Plastering, 850 yds. @ 18 cts., including material,	153.00
Slate, 2000 superficial feet @ 7 cts.	140.00
Chimney-cans, 2 @ $5.00,	10.00
Joists, 4800 feet @ $12.50 per M.	60.00
Rafters, 2000 feet @ $12.50 per M.	25.00
Studding, 7500 feet @ $12.50 per M.	93.75
Framing timber (white pine), 2100 ft. @ $18 per M.	37.80
Sheathing boards, 2000 feet @ $9.00 per M.	18.00
Flooring boards, 2300 feet @ $27.00 per M.	62.10
Mather boards, 5000 feet @ $27.00 per M.	135.00
Carpenter work, 220 days @ $2.00,	440.00
Window frames, 14, with sash and inside shutters, delivered at the building @ $12.00,	168.00
Window frames &c., for kitchen, 2, @ $10.00,	20.00
	1584.65

Doors 1¾ inches thick, 5, delivered @ $3.25,	16.25
Doors 1½ inches thick, 11, delivered @ $2.25,	24.75
Doors 1¼ inches thick, 4, delivered @ $2.00,	8.00
Assorted lumber, 4200 feet @ $25.00 per M.	105.00
Stairs, including all material,	90.00
Front porch, including all material,	85.00
Back, including all material,	35.00
Tin, for gutters and conductors,	30.00
Painting and glazing,	160.00
Hardware, including locks, &c., &c.,	136.00
	690.00
	1584.65
Total,	2274.65
Difference between the elevations, &c.,	550.00
	2824.65

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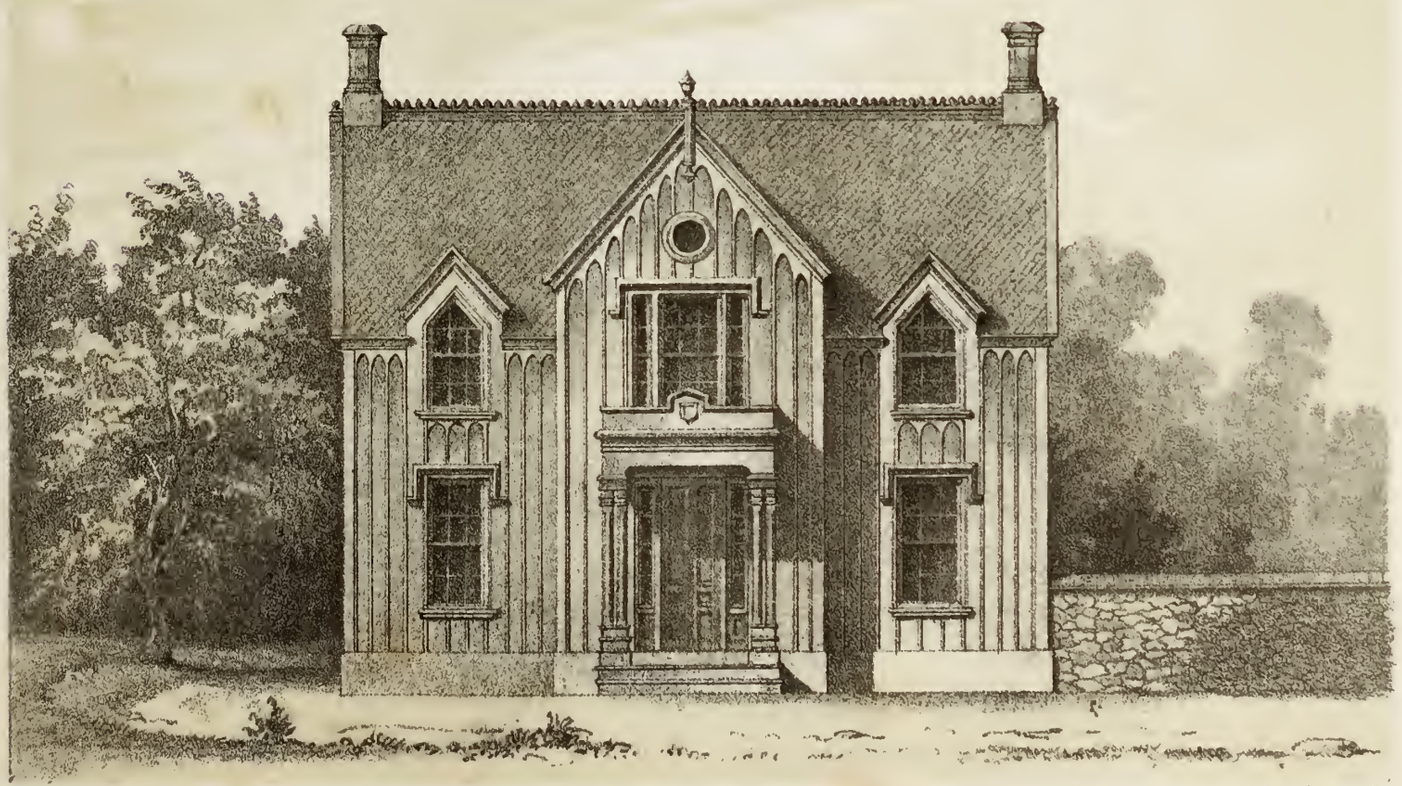
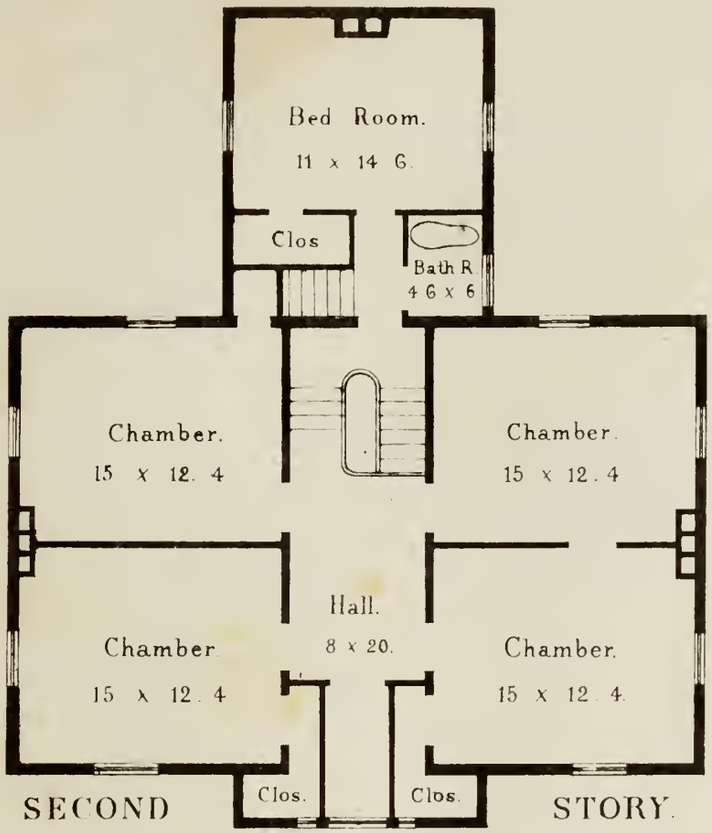
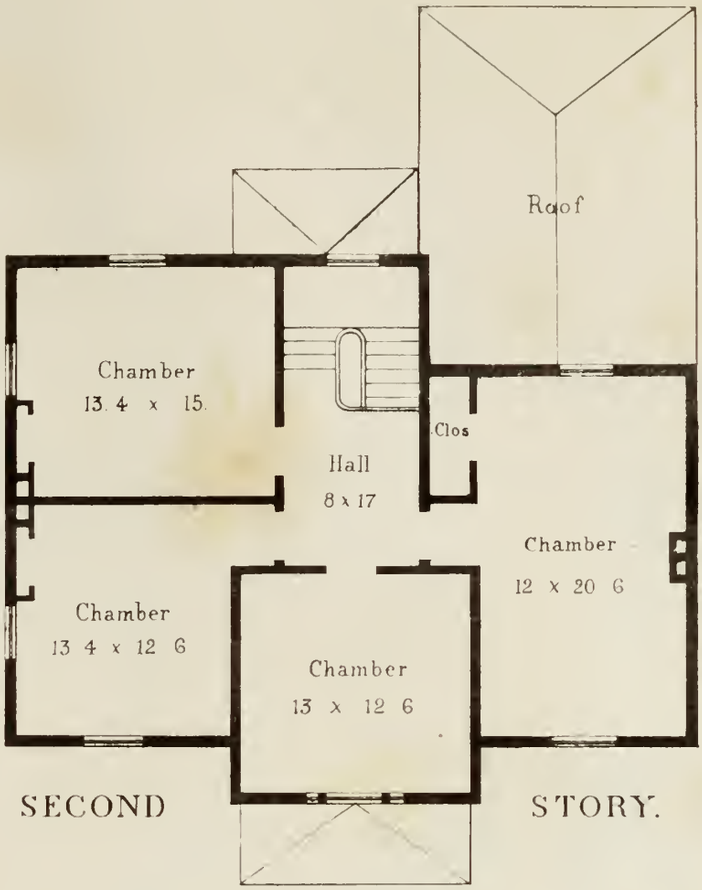
DESIGN FOR A COTTAGE.

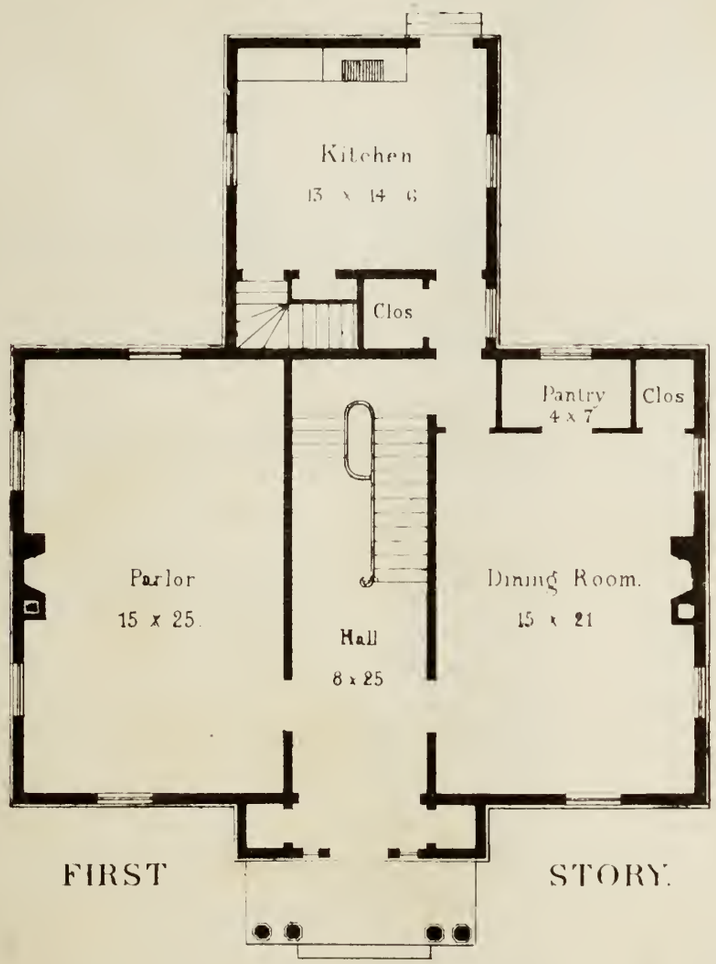


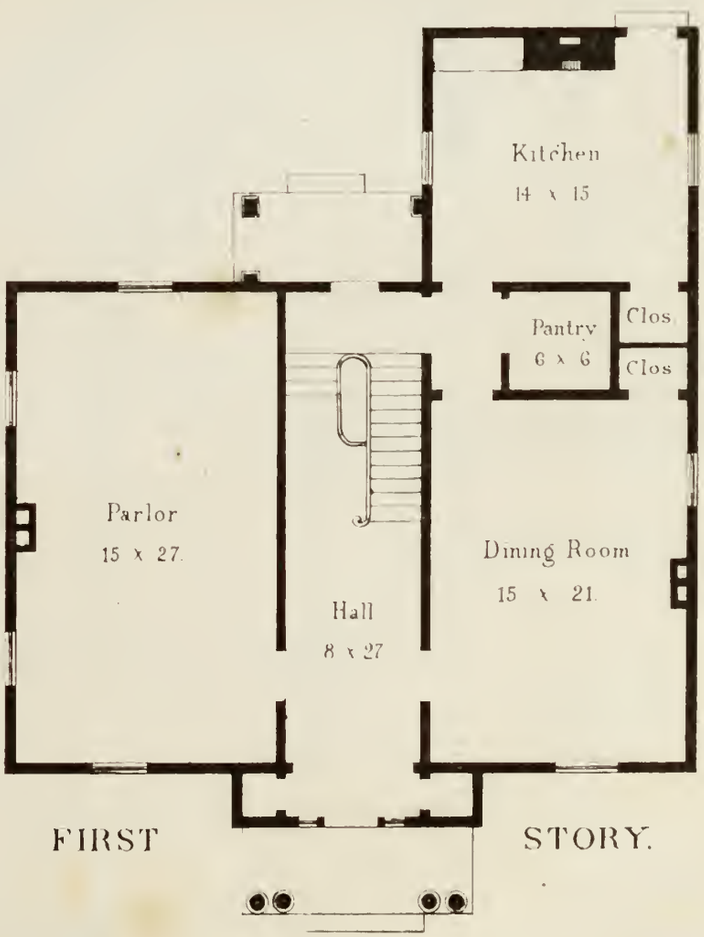
Sam[l] Sloan Arch[t] P S Duval's Steam lith press Ph

DESIGN FOR A COTTAGE.









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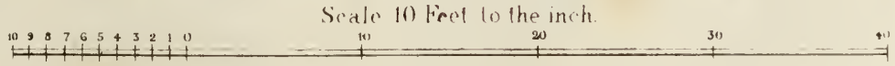
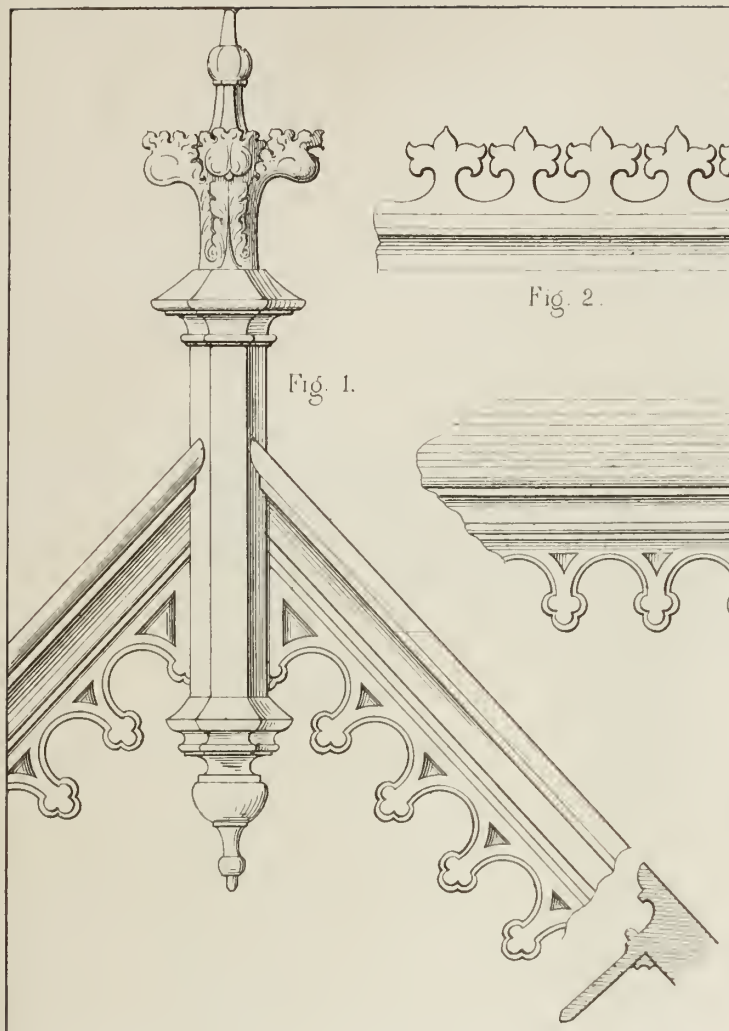


GROUND PLANS.

P. S. Duval's Steam Lith. Press, Phila.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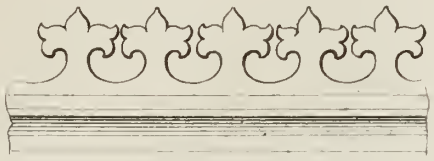
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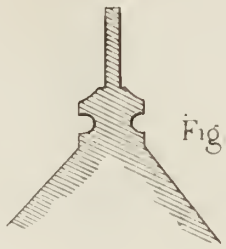
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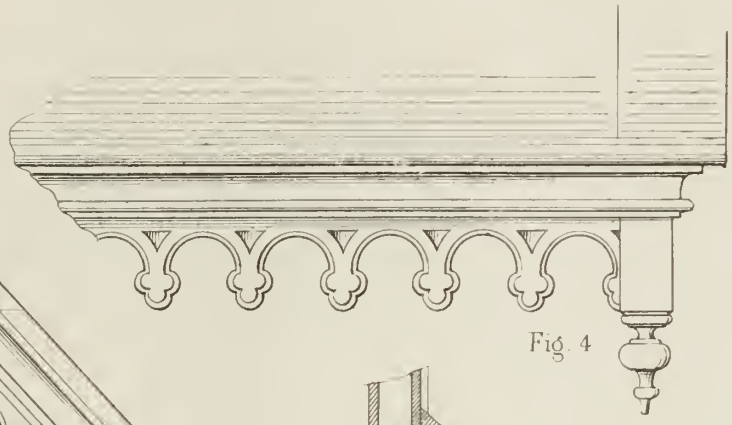
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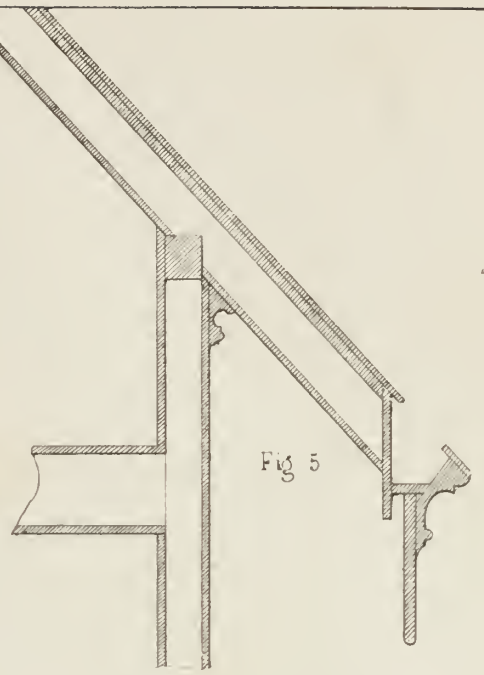


Fig 5

Fig 10.

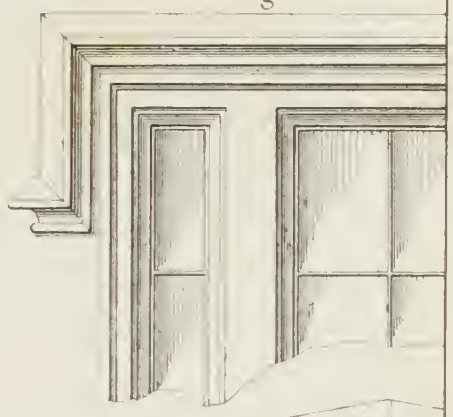


Fig 9

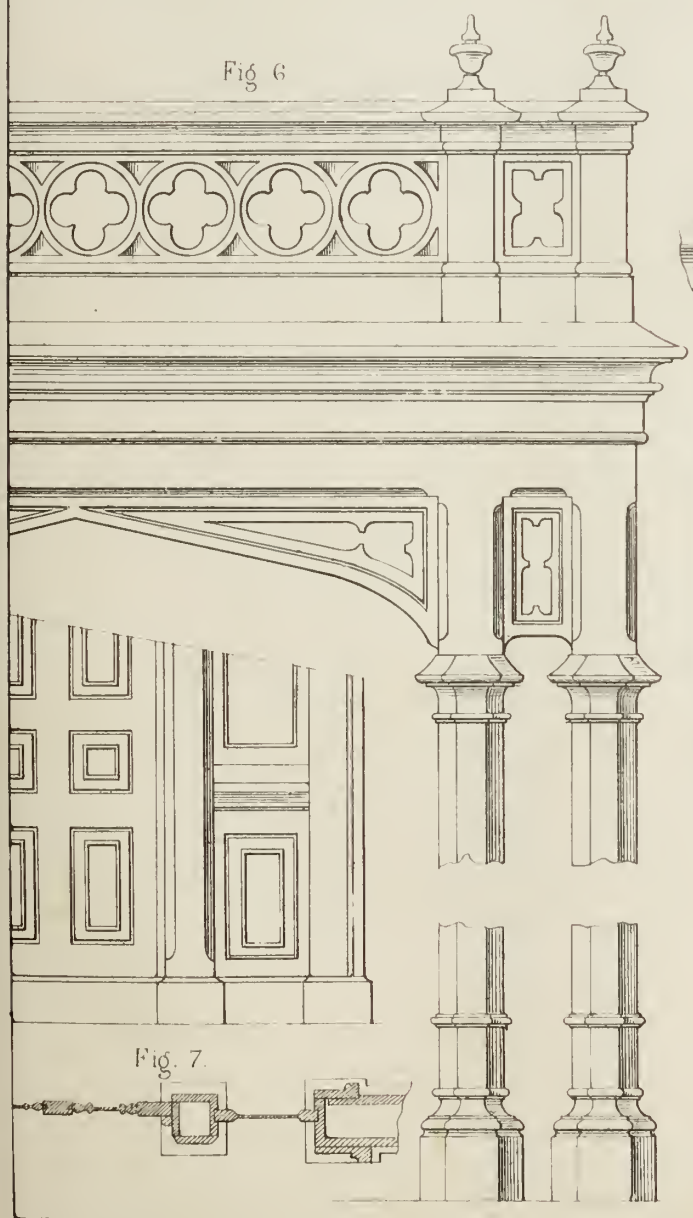


Fig 6

Fig 11

Fig. 7.

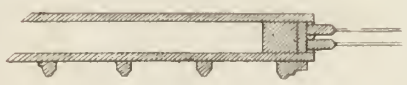
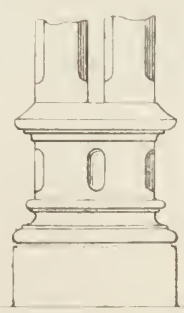


Fig 12

Scale ½ inch to the foot



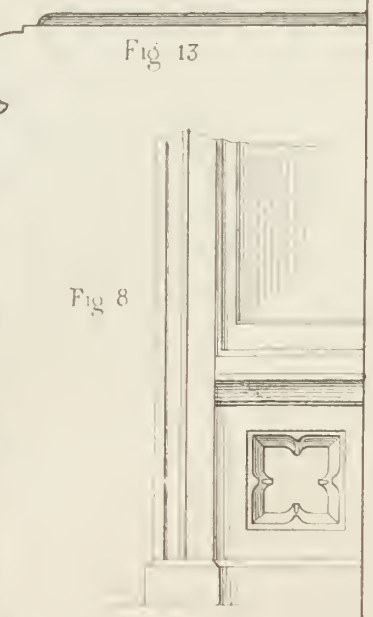


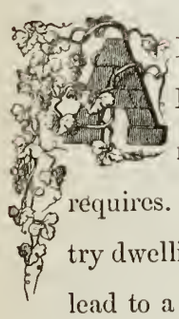
Fig 13

Fig 8

P. S. Duval's Steam Lith. Press Phila.

DETAILS.

THE FOUNDATION.



FTER preparing the excavations, the next step towards building is to lay the foundation. By this term all the walls as high as the first tier of joists, are included. It must be remembered that in this series of articles no more is treated of than the nature of our work requires. To go beyond this would lead into discussion of points unessential in the erection of country dwellings. Should we attempt, for instance, to give a complete treatise upon foundations, it would lead to a long dissertation, including an account of the various methods pursued in laying the foundations of such vast structures as prisons and forts, and also of such as are erected in marshy ground or in water, such as light-houses, bridges and docks. We should have to discuss the various topics connected with pile-driving, coffer-dams, caissons, pierre perdue and the like. All this would be quite foreign to our purpose and require much more space than we have apportioned to the subject. Let it be understood then, that we wish merely to give a concise yet comprehensive view of the foundations requisite for such buildings as are described in this work; yet even within these limits, we fear our space will not permit an entire investigation of the subject.

In the article upon excavations mention was made of concrete as a valuable aid in procuring good foundations. Little attention has been given to concrete in this country, at least for such small structures as dwelling houses. It is composed of stone chips or coarse gravel mixed with lime while hot from slacking. Sometimes the lime is mixed in the caustic state with the stone or gravel and water then poured upon it. This practice is strongly reprobated by the most experienced, who insist that it is far better for the lime to be brought to a thick paste before using. It may also be made into a mortar by mixing with it a small quantity of sand. In any case marble chips combined with hydraulic lime, are the best materials that can be used. When hydraulic lime is used in combination, instead of the ordinary lime, the mass is usually termed béton.

When concrete is placed in its position it should be rammed until the mortar begins to flush out at the top. This then, allowed to dry, is incompressible and firm, and gradually becomes converted into an artificial stone. It is evident that this concrete or béton can only be used when it has a support at the sides. It has often been used to fill between inner and outer courses of stone where the walls are of great thickness. It frequently may be advantageously placed at the bottom of the foundation trenches, thus producing a firm and uniform bearing surface. Concrete may be regarded as a sort of imperfect rubble work, and its value consists in becoming quickly 'set,' and its ready self-adaptation to an uneven surface. It

is not a new method but was well understood by the accomplished architects of the middle ages, and was in use among the Romans.

The material best adapted for the foundation wall is granite. Its durability, solidity and firmness is superior to any other, and if laid in good mortar, of which we are to speak in a future article, it will last for centuries. Bricks in contact with moist earth are liable to disintegration and are therefore unsafe, so that of whatever material the superstructure be built, whether of wood, brick, stone or marble, it is best to have the foundation of good quarry granite.

Hewn stone is the best, since but little mortar is required, and in consequence of its flat surfaces the whole weight of each course, bears upon that immediately beneath, without even a tendency to lateral pressure. The stone which splits from the quarry in cubical blocks is less expensive and equally good. But when neither can be obtained, an excellent foundation may be formed of rubble work. The greatest advantage of the other consists in having fewer and smaller mortar joints, and hence yielding less to the superincumbent weight. If, however, the foundation is to be of rubble work, stones should be selected having at least two surfaces parallel, which when laid horizontally form an excellent firm wall. This precaution is essential, because stones of an irregular shape tend to wedge into the course beneath, and only the cementing qualities of the mortar preserve the wall from being destroyed. We refer more particularly here to such parts of the wall as are above ground or constitute the cellar walls. Another precaution may be suggested. Masons, in order to have the face of the wall look well, are apt to lay the largest stones on the exposed side. This side then, in setting, yields less than the other, and hence the wall leans or is weakened by cracks. In a previous article we mentioned that it is a good practice to allow the foundations to remain exposed for a season before erecting the superstructure. This is especially true in the case of rubble work, thereby giving it a fair opportunity of becoming fixed.

But whatever be the character of the others, the first course should be laid with broad flat stone, the largest that can be procured. By this means any slight irregularity in the nature of the bearing stratum, may be avoided, and we more certainly secure that uniformity of settling which is so desirable. It is for this that concrete or béton is recommended. Before setting it yields freely and adapts itself to the surface of the bearing stratum, and afterwards it may be regarded as one large stone. It also presses laterally and thus distributes the weight more. To this end, where the earth is firm and not liable to the action of water, a layer of sand at the bottom of the foundation trench is also recommended.

Where the ground is treacherous, we must resort to some expedient to throw the weight of the building upon a deep firm stratum. This may be done by driving piles at short distances from each other, and by springing arches in the walls, from one to the other. The plan is also recommended, under certain circumstances, of boring holes at different points and refilling them with sand for the support of the arches. Such expedients require a great deal of care and skill, and are only requisite in extreme cases, seldom being necessary for dwellings.

A much more important matter, is the footing. To produce this we lay the first course much broader than the intended thickness of the wall, and gradually narrow each succeeding course until the requisite thickness is attained. By this means we give the wall greater strength in resisting any lateral force which may bear against it, such as the wind, and hence it is of importance in the erection of towers. But a much more essential advantage is gained thereby, in distributing the weight over a greater surface of the bearing stratum. The walls of St. Paul's Cathedral, in London, are to this day uninjured and firm, although they are erected on a bed of clay, only from ten to twenty feet thick, overlying a quick-sand. The most important points in the construction of footings are to build them of the largest blocks, and to keep the back joints as far from the exterior as possible. It is also desirable to give as little projection to the footing courses as may be essential to the end in view, otherwise a very slight lateral force may crack them entirely from the face of the main wall, and disastrous consequences ensue.

It may appear that we give to this subject more attention than its importance demands, and recommend practices which are unnecessary. When we reflect, however, on the desirableness of a firm foundation, we are forced to believe that too much care and skill cannot be exercised in its construction. How often are buildings, which were intended to last for years, found cracked from top to bottom, and how often do we hear of walls actually tumbling and crushing the workmen, or it may be, if later, the inmates of the building. The vast majority of these accidents, if properly inquired into, may be traced to a defect and consequent movement in the foundation. Thus are those unsightly and dangerous fissures produced, or it may be, the wall is slightly moved from its perpendicular, and hence either falls itself or yields to an otherwise ineffective lateral force. In Great Britain and throughout Europe much more attention is paid to this subject than here, and this is one principal reason why buildings there so far surpass ours in durability. When building, why not build well; why not erect such a dwelling, that fifty years hence it will still be valuable property and not an incumbrance? In even twenty or thirty years many of our houses become superannuated and crazy, while those in the old world remain, valuable legacies to posterity and interesting exemplars of their times. We Americans are not ashamed that we have nothing now venerable in years, but we may fear that our descendants will have cause so to be, and have few buildings to point out, saying, this is the work of our fathers.

A COTTAGE.

DESIGN THIRTEENTH.

On Plate LVIII. is presented the perspective view of a cottage, the front elevation of which is on the left side of the plate above. We have before incidentally remarked upon the ease with which every man may make his home pleasant, not only by its internal convenience, but by its tasteful appearance. It is usually considered necessary, in order to build in good taste, that a variety of ornaments should be stuck on here and there, even when they may be entirely unessential in the construction of the building. The expense attending this, has usually deterred those having a limited amount from even attempting to give their buildings a handsome appearance. But we beg leave to state, that this general opinion is a very great mistake, and are happy in believing that it is becoming less prevalent. We must remember that the first element of architectural beauty, is graceful proportion. Even the plainest house will please, or at least cannot displease, when its proportions are good; but when they are not, nothing can save it from just censure. Ornaments we may divide into two classes. Features which belong essentially to the building, and are made ornamental by giving them shape and finish, such as the chimney tops, shingles, the ends of the rafters, brackets, and we may mention in this design the cleats of the weather-boarding. To make these contribute to the appearance of a building, but little expense is necessary. The other class of ornaments are those which are not essential to the building, but which suggest at once to the mind a need which they appear to supply. In this class we may include a great many brackets, which apparently yield support to parts which do not really require it of them. Either of these two classes of ornaments may be enriched by mouldings or carvings which every where must thus be made subordinate.

By using good proportions, and the first class of ornaments, we may display great taste in a building, and make it please the eye much, without additional expense. Hence we hold fast to the opinion, that there can be no reason for putting up those bold, bare and flat houses, which unfortunately are everywhere. We have endeavored to express in this design the above thoughts, and venture to say that the same room and conveniences could not be obtained by the same methods of construction at less expense. The cost of the building finished throughout, would be about two thousand dollars.

On left side of Plate LIX. are the ground plans of this design. Both the plans and elevations are in a scale of sixteen feet to the inch. The house is quite large and roomy although apparently small, which is because of the reduced scale, and will accommodate a family of ten persons, including the servants. It is designed to be warmed by grates, but in a cold climate a furnace would be preferable. It may be observed that there is no furring-out marked upon the plan for the attic floor. This was omitted because the elevation is so designed that the outside wall extends two feet above this floor. As the attic rooms however are quite large the outside walls might be reduced and the furring-out easily arranged.

Plate LX. consists of details. Fig. 1, is a chimney-can. Fig. 2, is the gable window. Fig. 3, a section of the same. Fig. 4, the finial and eave ornament of the gable showing a section of the cornice. Fig. 5, ornament of the drip eaves. Fig. 6, front porch. Fig. 7, section of the same. Fig. 8, vestibule bay window. Fig. 9, section of the same. This plate also exhibits a side elevation of the design. It may be remarked that the strong contrast of white and black lines in this gives it a harsher appearance than it would have in nature.

SPECIFICATION

Of the labor and materials to be used in the erection of Design Thirteenth.

GENERAL DESCRIPTION.—The first story is to contain a parlor fourteen by twenty-four feet in the clear, a hall seven by twenty-four feet, a vestibule seven by eleven feet, a dining room eighteen by eighteen feet, and a kitchen twelve by eighteen feet, having a closet between it and the dining room two feet and six inches deep. The second story will contain three chambers, one fourteen by twenty-four feet, one eighteen by eighteen feet and one twelve by eighteen feet, besides a bed room seven by fourteen feet. The attic story will contain three chambers, one fourteen by twenty four feet, one eighteen by twenty four feet and one fifteen by eighteen feet. For the relative position of these rooms reference must be had to the plans. The first story is to be twelve feet eight inches from the first to the top of the second floor. The second floor is to be ten feet to the top of the attic floor, the attic rooms are to be seven feet and six inches in the clear, and the roof is to have twenty feet pitch. There is to be a porch on the front eight feet wide by thirteen feet long, and one on the rear seven by twenty-two feet.

EXCAVATIONS.—The cellar is to be, throughout the entire extent of the building, five feet deep from the surface of the ground, the earth therefrom being graded around the building as hereafter directed. The trenches for the foundation walls are to be at least six inches below the bottom of the cellar. The trenches for the porch foundations are to be of sufficient depth to secure them from the effects of frost.

MASONRY.—All the walls of the cellar must be composed of quarry building stone of a good quality. Those of the first course must be large and flat and solidly bedded in mortar. These walls are to be sixteen inches thick throughout, and eight feet six inches high from the cellar bottom. The mortar for this masonry must be composed of good coarse sharp sand and fresh wood-burnt lime in just proportions. All facings are to be smoothly dashed and afterwards lime washed.

BRICK WORK.—There are to be two stacks of flues emanating from the cellar, extending beyond the roof and surmounted with terra cotta chimney-cans, such as are exhibited on the plate of details. Each stack is to contain two flues nine by thirteen inches, well pargetted within and constructed of good sound brick laid in strong mortar. Their positions must be taken from the ground plans. All piers or cross walls in the cellar, for the support of the joists, must be constructed of sound brick and their facings smooth dashed.

FRAMING, &c.—The sills of the outside and division walls are to be six by six inch Norway pine. The corner posts and girts are to be four by eight inches and the plates are to be four by six inches, all of white pine. The intermediate braces and studding, and the studding throughout the partitions, are to be three by four inches, and placed sixteen inches between centres. The whole is to be well framed and pinned as is usual for such buildings. The exterior is to have hemlock laths one and a fourth by three inches, nailed in horizontally flush with the face of the studding, and three feet between centres, to which the weatherboards are to be secured. The joists of the first floor are to be three by twelve inches, those of the second are to be three by eleven inches, and those of the attic are to be three by nine inches, all of hemlock, and placed sixteen inches between centres. The trimmers for the flues and stairs are to be double thickness. The joists are all to be backed and are to have a course of herring bone bridged through the centre. The rafters are to be eight inches at the foot, of the usual rafter cut, and placed two feet between centres. The ridge pole is to be three by twelve inches, and the collar beams one and a half by six inches, strongly nailed to the rafters.

The exterior of the building is to be boarded vertically with one inch boards, of a uniform width to each front, from ten to thirteen inches, grooved together and cleated as exhibited on the plate of details. The rafters are to be lathed with hemlock strips, which must be overlaid with white pine shingles of a good quality, laid in courses of eight inches each in a diamond pattern. Each shingle is to be secured with two eight penny nails.

FLOORS.—All the flooring is to be a good quality heart pine flooring boards, well worked, well seasoned and firmly nailed to the joists, with the joints afterwards shot. Those in the porches are to be of white pine boards, quite narrow and laid with white lead in the joints.

STAIRS.—The stairs are to be made with heart pine step boards of a good quality. They are to have one and three quarter inch turned balusters, a six inch turned mahogany newel and a cherry rail, all put together in the best and most workmanlike manner.

WINDOWS.—The windows are all to have one inch and a half sash, and are to be double hung with axle pullies and patent cord. Those of the first and second stories are to have inside shutters, hung and secured in the usual manner. They are to be in three folds and are to part in the centre, each division having two panels neatly moulded on the face and with bead and butt on the inside. They are to fold into the soffits of the jambs.

DOORS.—The front door is to be one inch and three quarters thick, having panels with bead and butt on the inside and moulding with fillets on the outside. It is to be hung with four by four inch butts and secured by a seven inch upright mortice lock with porcelain mountings. The parlor, dining room, vestibule and back doors are to be one inch and a half thick, hung with three and a half inch butts and secured by four inch mortice locks. All other doors in the first

story and the five principal doors of the second story are to be secured by three inch mortice locks, but otherwise are similar to the rest. All other doors are to be one inch and a quarter thick, hung with three by three inch butts and secured as may be directed. All doors are to have panels and, except those in the kitchen and attic, must be moulded.

The closets are all to be fitted up and shelved wherever it may be required and the kitchen is to be furnished with a dresser fitted up with drawers, shelves, paneled doors, &c., as is usual.

DRESSINGS.—All the outside window and door dressings, the cornices, architraves and finials, are to be constructed as set forth by the details. The window and door dressings of the parlor, hall and dining room are to be six and a half inch architraves, with mouldings. Those of the second story are to be five inches wide, and those of the attic and kitchen are to be three inches wide. The wash-board of the parlor, dining room and hall is to be twelve inches high, including the moulding and a two and a half inch sub. That of the second story is to be ten inches wide with a moulding and those of the attic and kitchen are to be four inches wide with a bead on the top.

TINNING.—The roofs of the porches and of the bay-window and all the gutters of the main roof are to be of the best one cross leaded roofing tin, painted on both sides, the upper receiving two coats. There must be provided three three inch conductors of the same material to convey the water from the roof to the ground.

PLASTERING.—All the walls and ceilings throughout the building are to have two coats of brown mortar and one of white. The parlor and vestibule is to have a cornice girting twelve inches and the parlor is to have in addition a centre piece three feet in diameter. The plastering is to be done with mortar composed of good clean river sand and fresh wood burnt lime in the best proportions. All laths are to be sound and free from bark.

PAINTING AND GLAZING.—All the woodwork of the interior that it is usual to paint must have three coats of pure white lead, mixed with the best linseed oil. The exterior is to be painted with four coats of Silver's patent fire proof paint in a brown tint. The stair rail, newel and balusters are to have four coats of varnish. The sash are to be glazed with the best American glass, well bedded, bradded and back puttied.

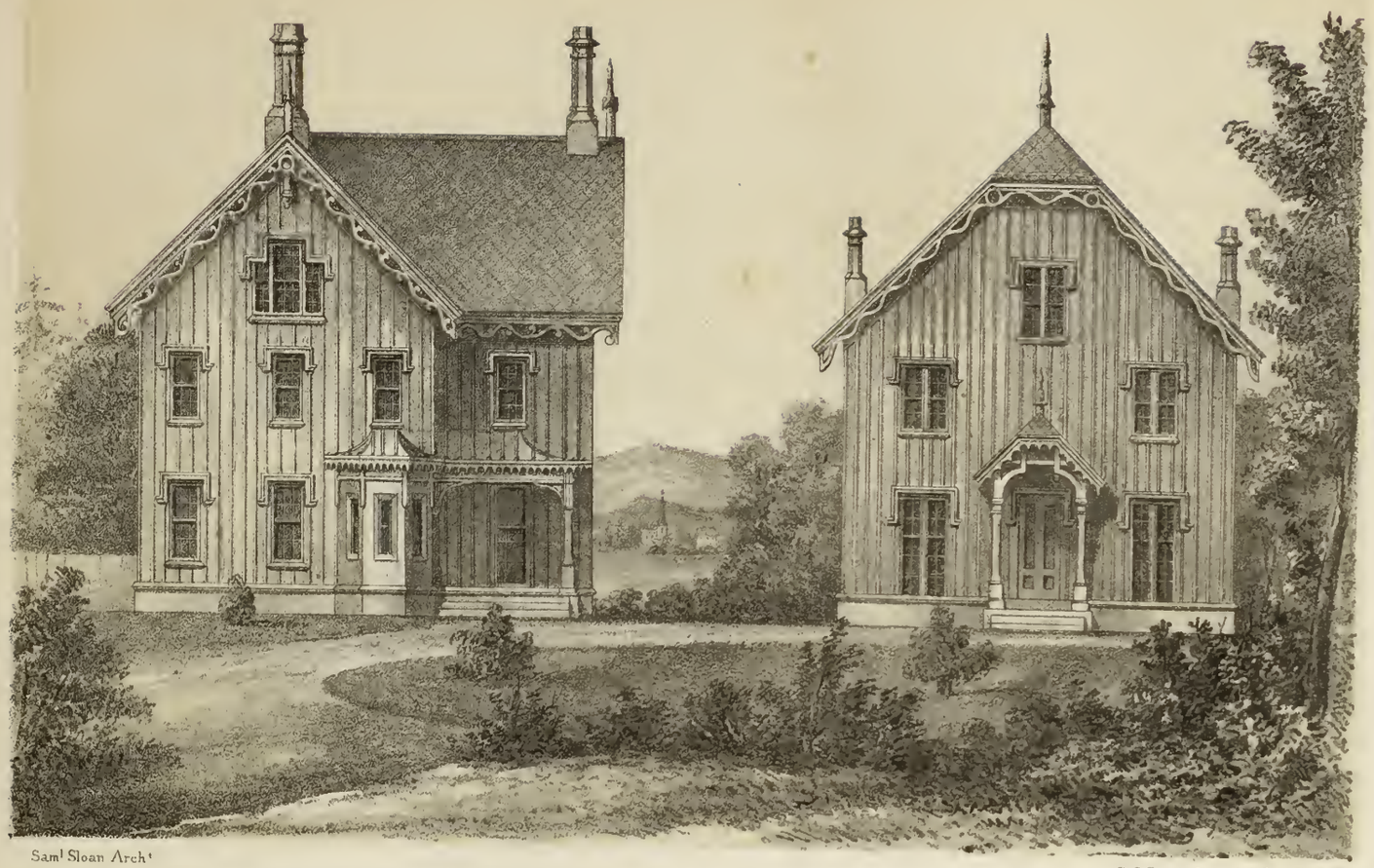
FINALLY.—The contractor is to furnish at his own cost all the material and workmanship necessary to finish and complete this building, according to the true intent and meaning of the plans and other drawings, and of this specification, and also to the satisfaction of his employer.

A COTTAGE.

DESIGN FOURTEENTH.

It is evident at a glance that this design, the front elevation of which is presented on the right of Plate LVII. possesses many points of similarity to the one which precedes it. Although the internal arrangement of apartments is totally different, yet we have adopted the same methods of construction and in a general way the same style for the dressings and finish. We have now presented three consecutive designs for houses whose sides are framed and vertically boarded. Frame houses are much preferred in many parts of our country, chiefly on account of their local cheapness, for in some places we find them outnumbering those of brick or stone, ten to one. The cost being equal, a brick house is much to be preferred but the other may be equally comfortable. Of this we shall have occasion to speak in future.

It has been the almost universal custom to place the boards on frame houses horizontally, making them to overlap each other so as to turn off the rain. There are many objections to this, not the least being the very disagreeable effect produced upon the eye, by a multitude of parallel lines, especially in the sun-light. The same objection does not seem to apply to vertical lines with equal force, and consequently they are preferable. Care must be taken however in these last to exclude driving rain. If the joints, before the cleats are put on, be made tight, we more certainly secure this end, but by nailing the cleats closely and using paint freely the liability may be avoided.



Sam[l] Sloan Arch[t]

P. S. Duval's Steam Lith. Press Philad[a]

COTTAGES.

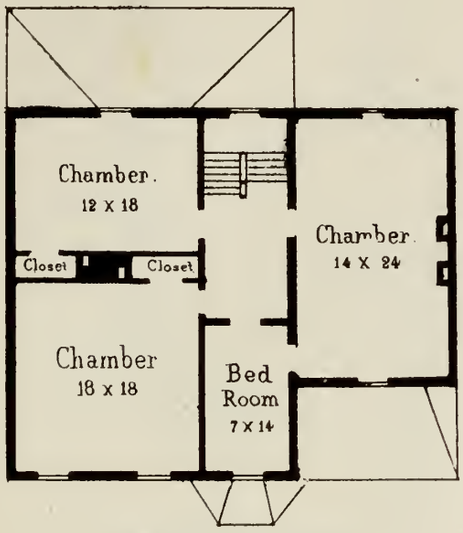
Design XIII.

Pl. LVIII.

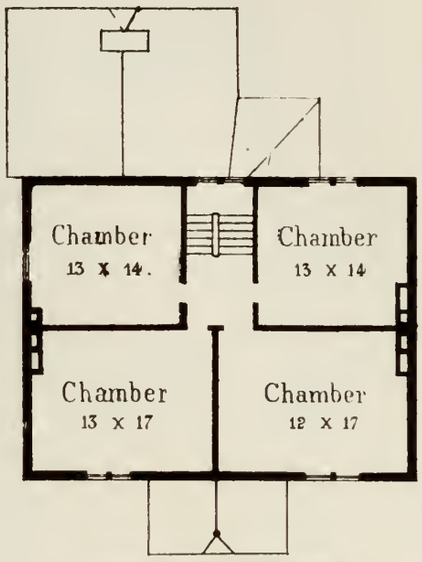
Sam[l] Sloan Arch[t]

P. S. Duval's Steam Lith. Press Philad[a]

PERSPECTIVE VIEW.



SECOND STORY



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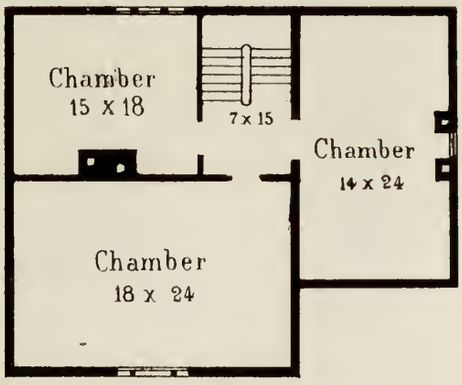
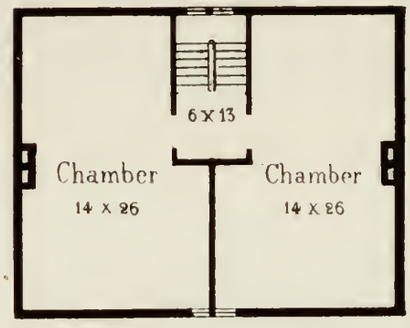


ATTIC STORY



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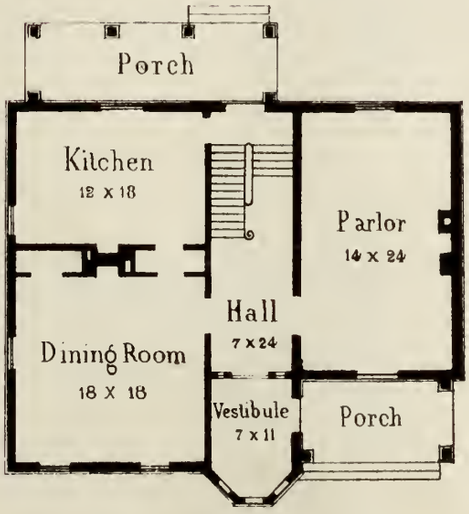
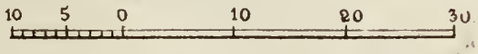


FIRST STORY.

FIRST STORY.

Scale 16 feet to the inch.



GROUND PLANS.

P. S. Duval's Steam lith. press Phil.

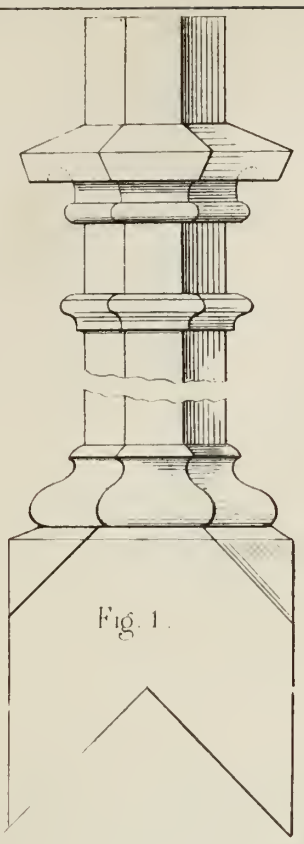


Fig. 1.

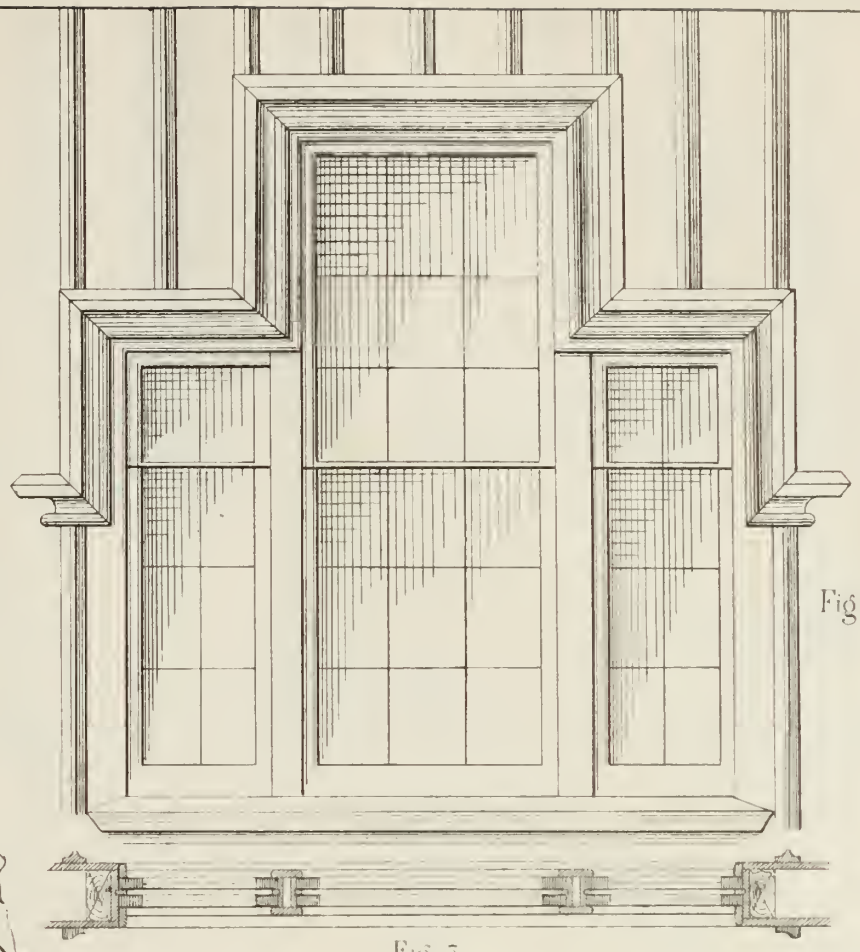


Fig 2

Fig 3

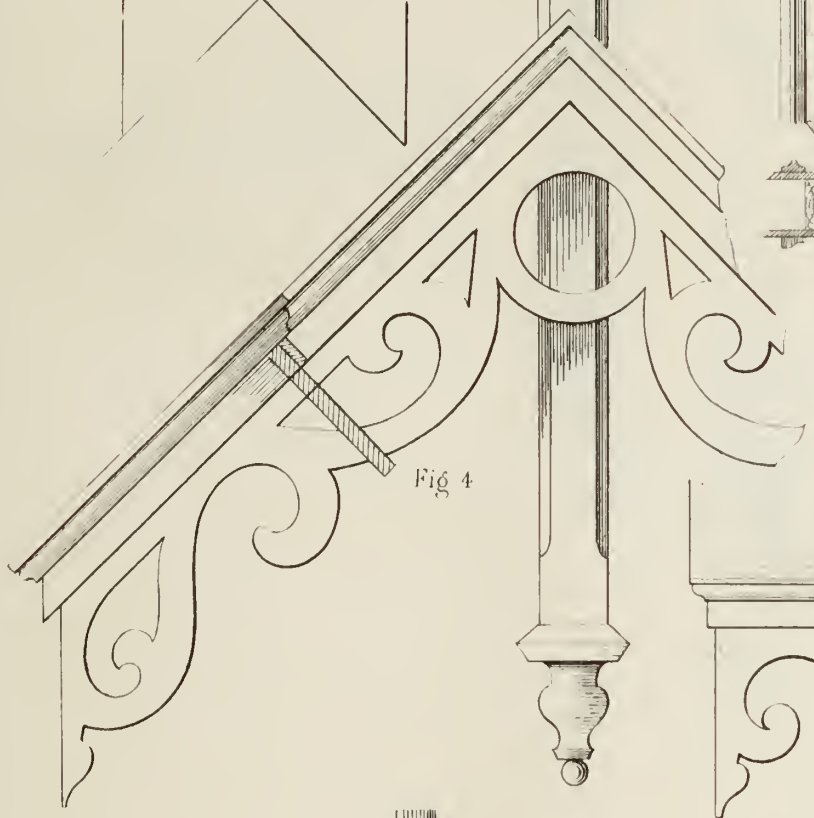


Fig 4

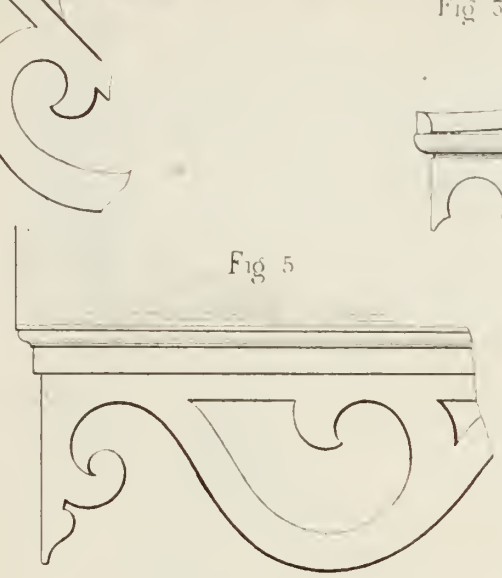


Fig 5

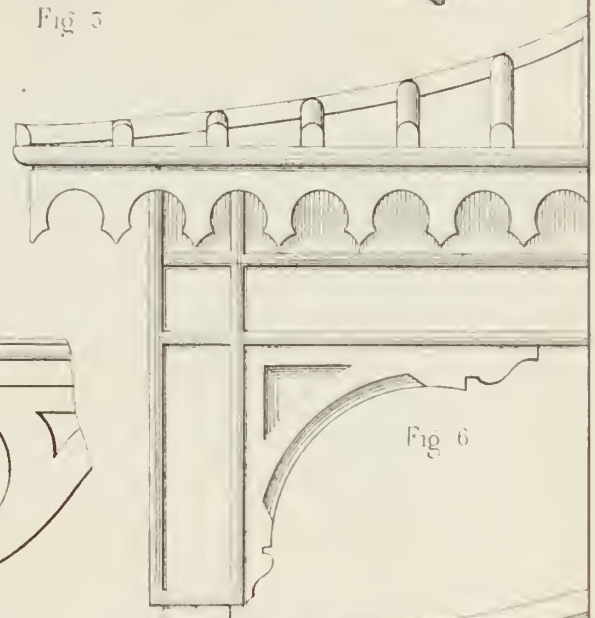
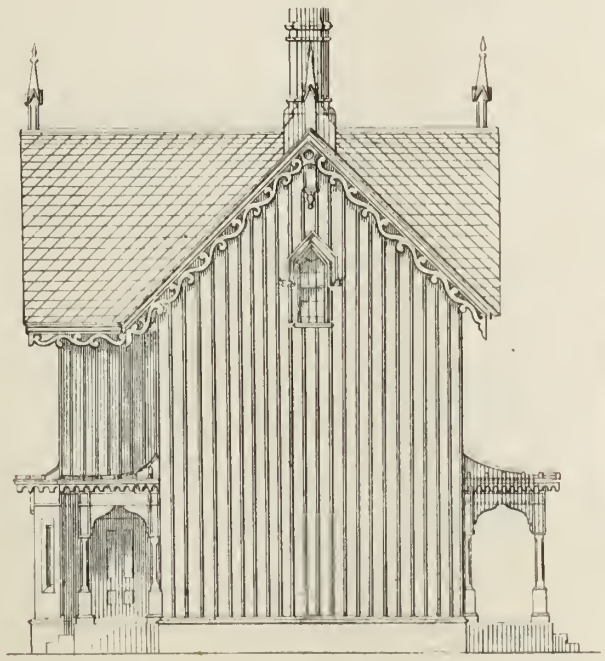


Fig 6



Side Elevation

Scale 16 ft to the inch

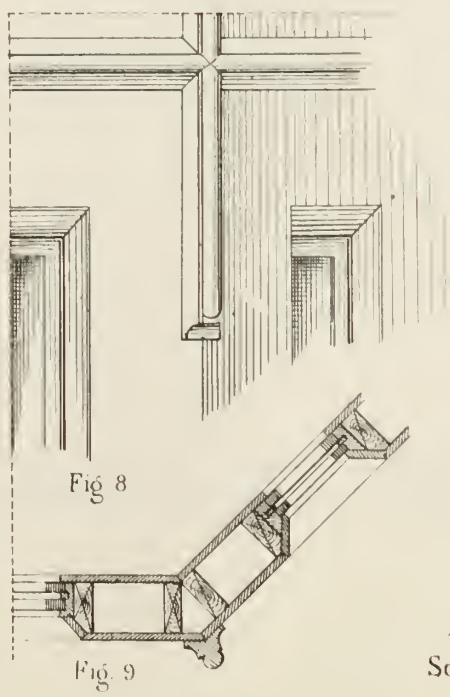


Fig 8

Fig. 9

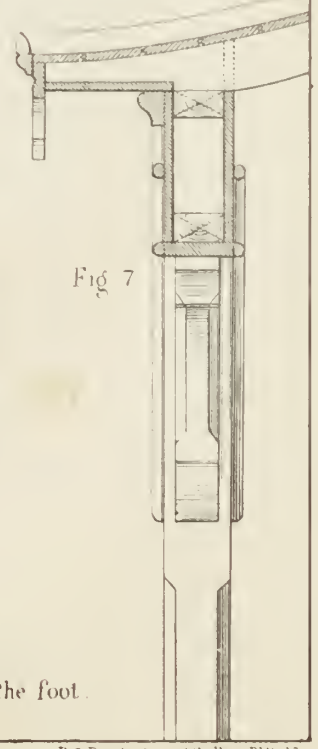


Fig 7

Scale ½ inch to the foot.

P. S. Duval's Steam Lith. Press Philad.ª

DETAILS.

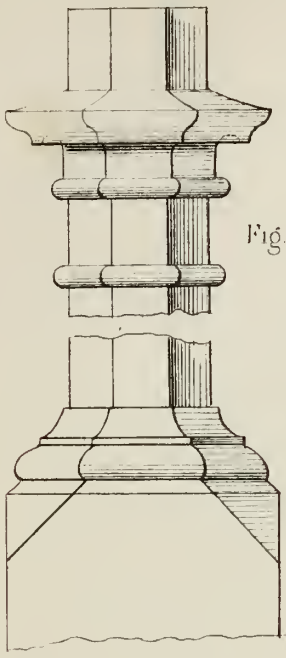


Fig. 1

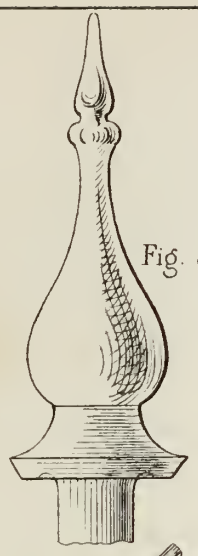


Fig. 2.

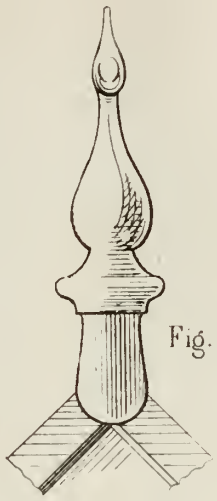


Fig. 5.

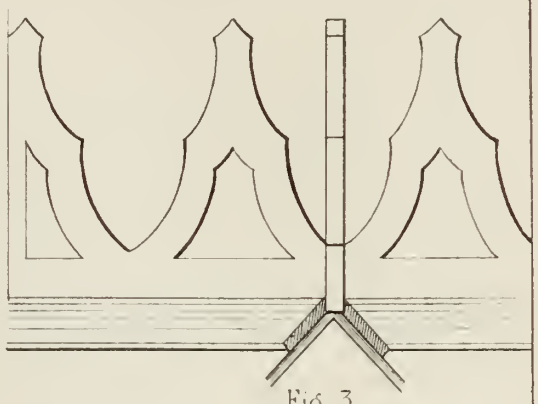


Fig. 3.

Fig. 4

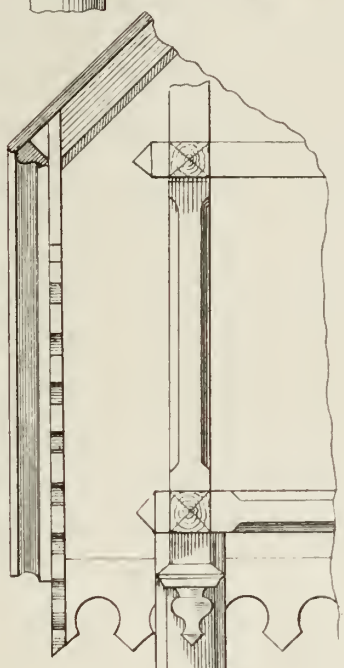


Fig. 7.

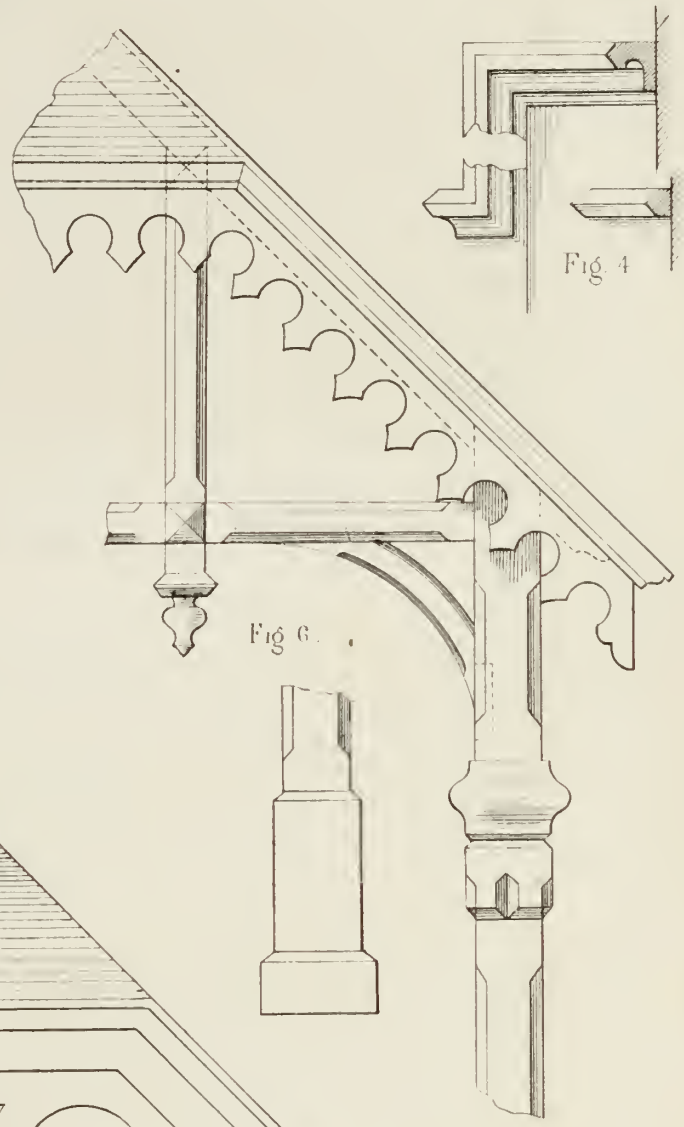


Fig 6.

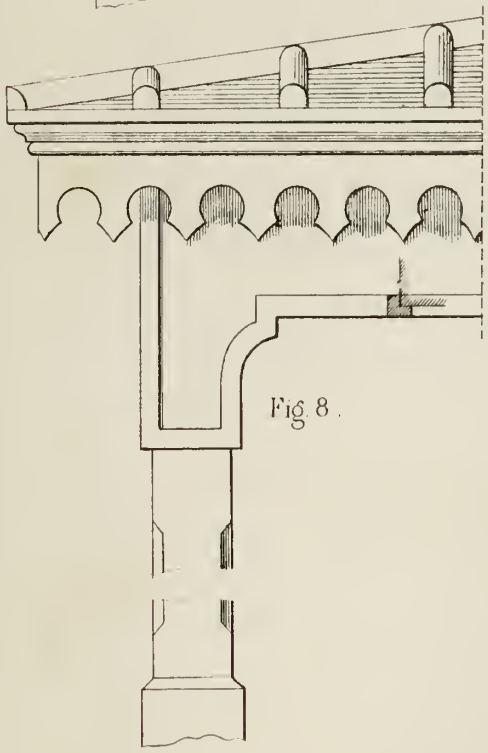


Fig. 8.

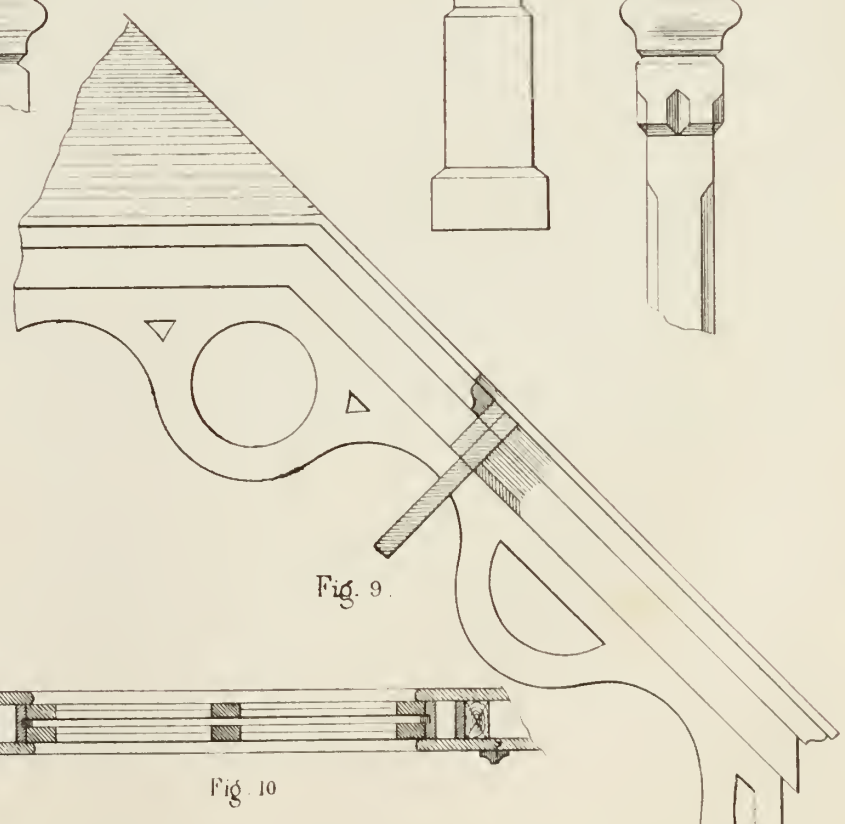
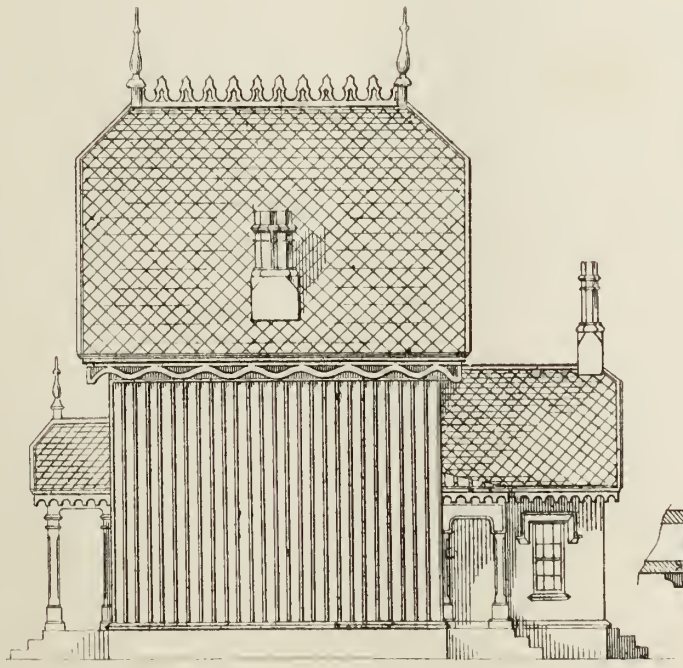


Fig. 9.

Fig. 10



Side Elevation,
Scale 16 ft. to the inch.

Scale ½ inch to the foot

P. S. Duval's Steam lith. Press. Philad.

On the right side of Plate LIX. are the ground plans of this design. It is also a good sized house, the scale being but one inch to sixteen feet. It is smaller, however, than the preceding design, and consequently less expensive. The porches too, being smaller, diminish the cost. The accommodations are about the same as those of the other, the only difference being in the size of the rooms, for we have on the second floor, as in the other design, four chambers. Two of these are thirteen by fourteen feet and the other two thirteen by seventeen feet. There is however on this floor in the other design a small bed-room and an additional chamber on the attic floor. It will be observed that in both designs the kitchen and dining room communicate by double doors. We regard this as essential to the pleasantness of a dining room in order to shut off more effectually the odors always attendant upon culinary operations.

On Plate LXI. are the details of this design. Fig. 1, a chimney-can. Fig. 2, the finial of the roof. Fig. 3, the Tudor flower with a section. Fig. 4, the hood-mould and sill of the windows. Fig. 5, the finial of the front porch. Fig. 6, a front view of the porch showing the framing and post. Fig. 7, section of the same along the peak, side view. Fig. 8, back porch. Fig. 9, eave ornament and cornice. Fig. 10, a section of the twin windows. Upon this plate also is presented a side elevation of the design.

The aforementioned similarity between the two designs renders it unnecessary that we should give a specification for this. That of the other with very few alterations may be substituted. In it we have specified the best style of finishing suited to the general design. Were this surpassed, incongruities would arise and there would be too much ornament or finish for the basis. On the other hand, however, we may detract from this finish very materially without destroying the completeness of the design or violating good taste, and at the same time diminish the cost. Were this building to be finished according to the specification the cost would be about seventeen or eighteen hundred dollars.

A SMALL VILLA.

DESIGN FIFTEENTH.

This is comparatively a small building, the principal room on the first floor being but fourteen by fifteen feet. It is best suited to a warm climate, for the open hall with the staircase in it would make a delightfully cool sitting room. The front elevation is exhibited on Plate LXII. and the side elevation on Plate LXIII. There is very little pretension in its appearance, but it possesses an air of neatness. The ornaments are few and simple, and at the same time present many bold features. It is by no means rural in its character, but would seem to indicate a degree of cultivation in its occupants, or rather, we should say, it seems to indicate that they have a greater acquaintance with the busy world than country folks generally possess.

On Plate LXIV. are the ground plans of this design. The porch and pantry, placed on opposite sides of the hall, give symmetry to the design. The apartment marked 'living room' is intended to be used both as a sitting and dining room, and in cold weather as a parlor also. As was before intimated, the hall will admirably serve this latter purpose during the summer months. The window in the kitchen is designed to open to the floor, thus giving a means of egress. The stairs

to the cellar are beneath the hall. The flues are to be overdrawn so as to issue from the point in the roof indicated on the elevations. The building will accommodate a family of four or five with the servant included.

On Plate LXV. are the details. Fig. 1 is the front gable. Fig. 2, a section of the same, showing the bracket. Fig. 3, the gable window. Fig. 4, a vertical section of the same. Fig. 5, a horizontal section of the same. Fig. 6, the cornice and post of the porch. Fig. 7, the window beneath the balcony. Fig. 8, side view of the balcony. Fig. 9, the circular window of the gable. Fig. 10, a section of the same. Fig. 11, the chimney-can.

We deem it unnecessary, in this case also, to give a specification, in consequence of its great similarity to preceding designs. We may, however, mention that it is intended to have brick walls, rough-cast without the pointing. The roof is of tin. If it be desirable to build on this plan, but at less expense, the house may be framed and the studs lathed without and then rough-cast. The appearance in this case would be the same, the only difference being in the permanency of the building. Instead of lathing, we might closely board the outside, having the joints tongued and grooved. This, then, painted and sanded, would look about as well and be much stronger than if it were lathed. In view of this latter case the plates of details have been arranged. The cost, if built of brick, would be $1200, if boarded, $1050.

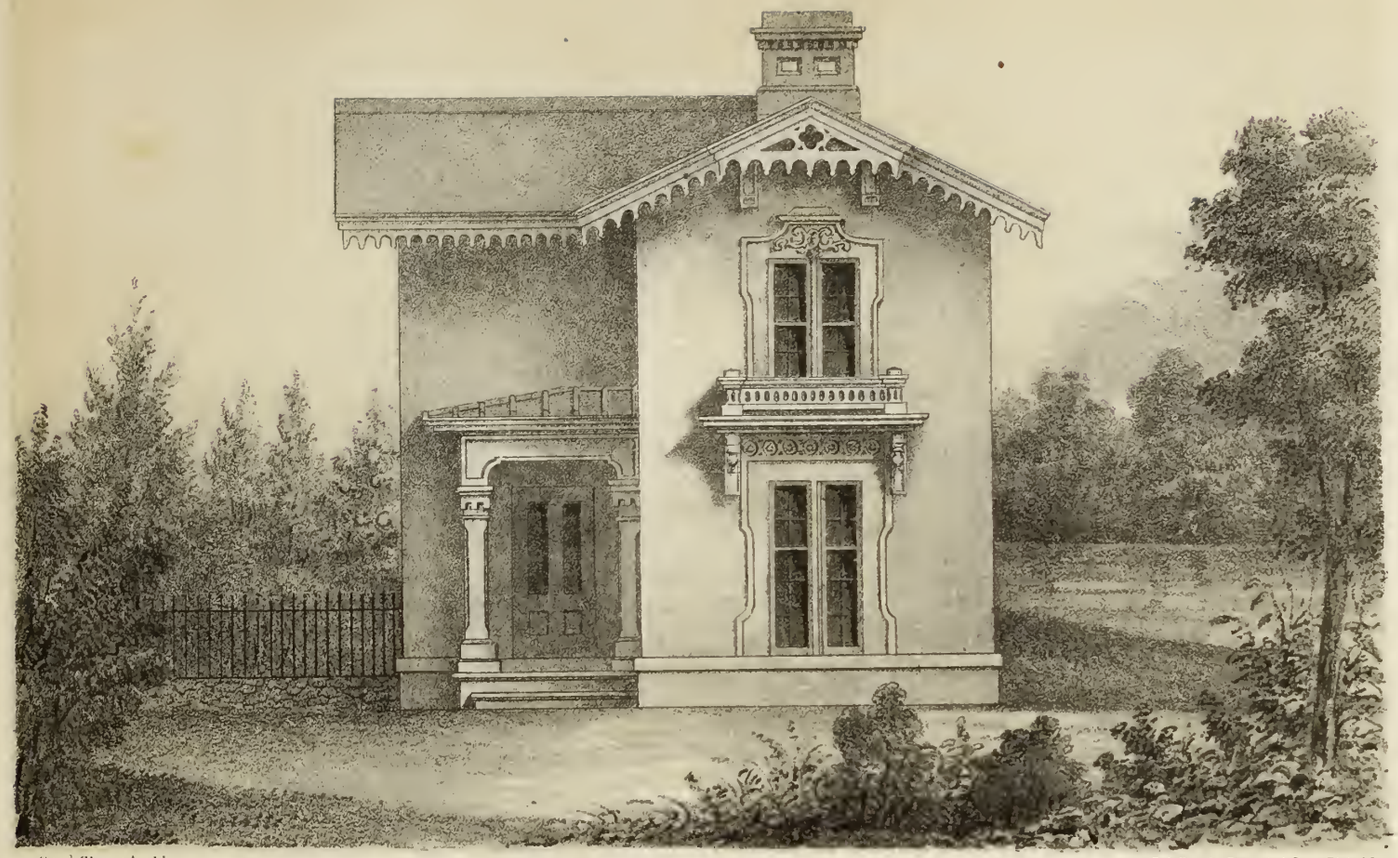
A PLAIN DWELLING.

DESIGN SIXTEENTH.

On the upper portion of Plate LXIV. are the ground plans of this design. It is quite simple and requires no explanation. In every building the greatest sources of expense, perhaps, are the doors and windows, and wherever they can be dispensed with the expense is accordingly diminished. In the parlor of this plan the rear window might very well be left out. It looks immediately into the back yard, and cannot be needed for any other purpose than that of lighting and ventilating the room, which object is sufficiently attained by the other two as the room is small. The same remark may be applied to the corresponding window in the chamber above. One window would be amply sufficient for the kitchen and one for the bed room above. Two were introduced in each that the intermediate spaces might be equal. This is not, however, of very great importance.

The front elevation of this design is on Plate LXVI., together with the details. Fig. 1 is the balustrade on the roof. Fig. 2, the post cap of the same. Fig. 3, the end of the chimney stack. Fig. 4, a front window. Fig. 5, the cornice and posts of the front porch. Fig. 6, the cornice of the building.

The roof of this building is to be of tin, and the walls are to be framed, closely boarded, painted and sanded in the way suggested for the previous design. There is, it will be perceived, a front porch exhibited on the elevation which is not laid down on the plans. With this porch, an end view of which is also given, the cost of the house would be about $1450.

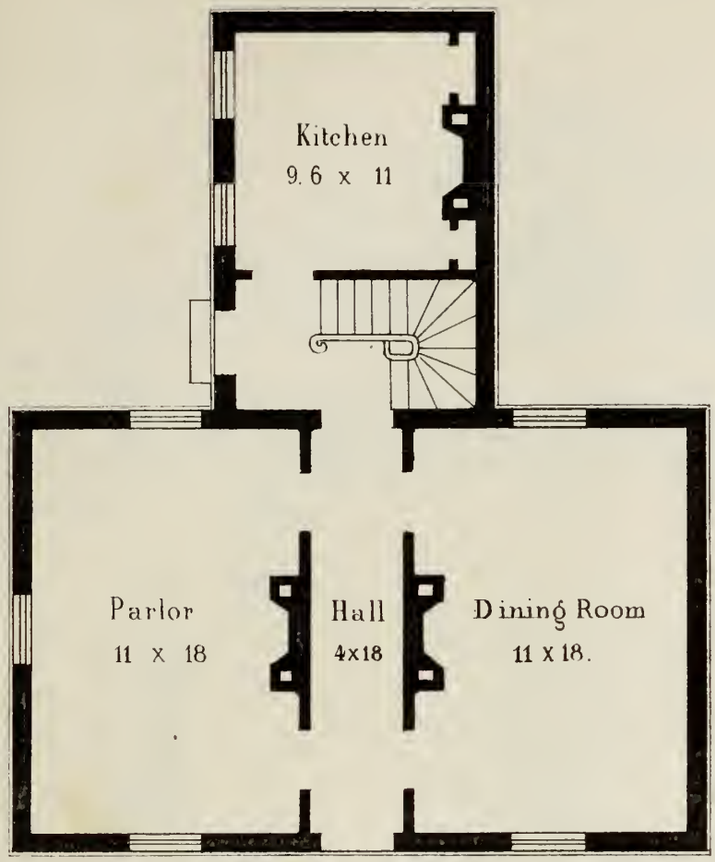


Sam[l] Sloan Arch[t] P. S. Duval's Steam Lith. Press Philad[a]

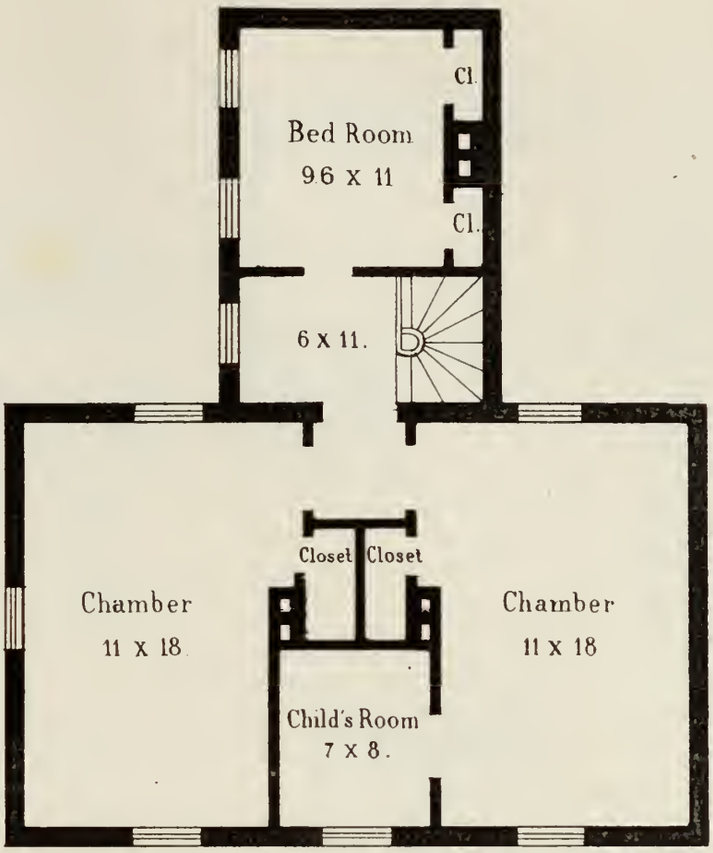
A SMALL VILLA.

Sam[l] Sloan Arch[t] P. S. Duval's Steam Lith. Press Philad[a]

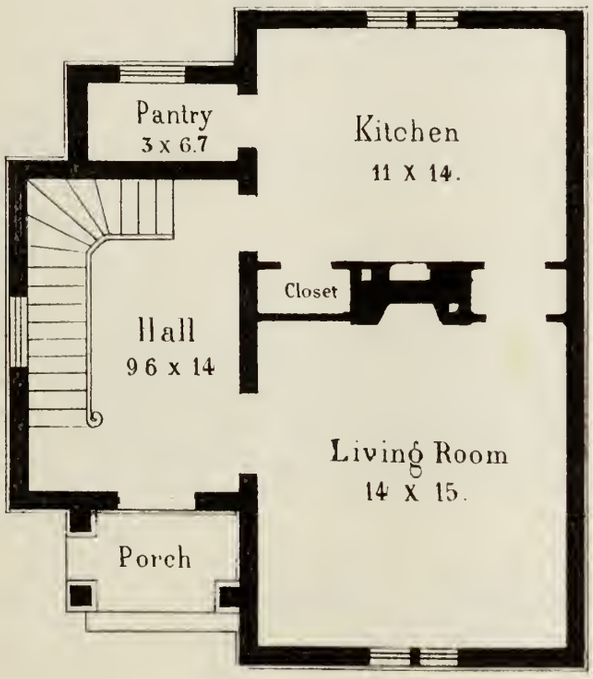
SIDE ELEVATION.



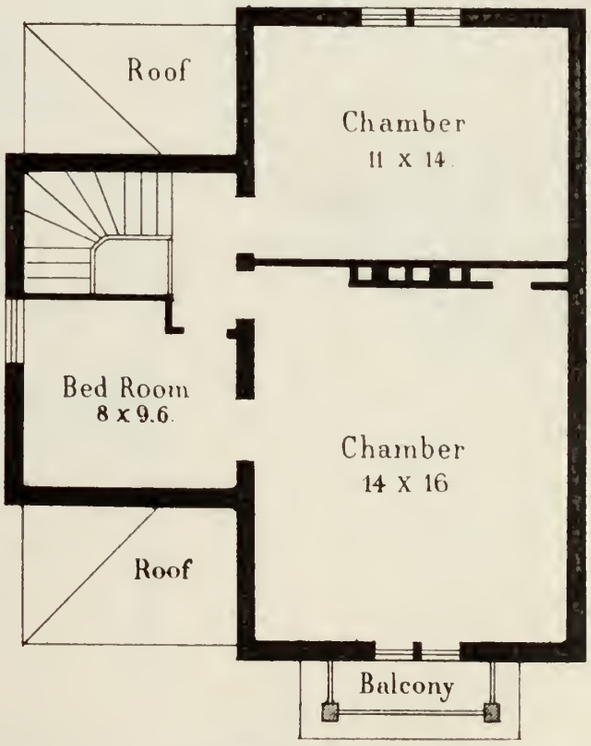
FIRST STORY.



SECOND STORY.



FIRST STORY.



SECOND STORY.

Scale ⅛ of an inch to the foot.

GROUND PLANS.

P. S. Duval's Steam Lith. Press Phila.

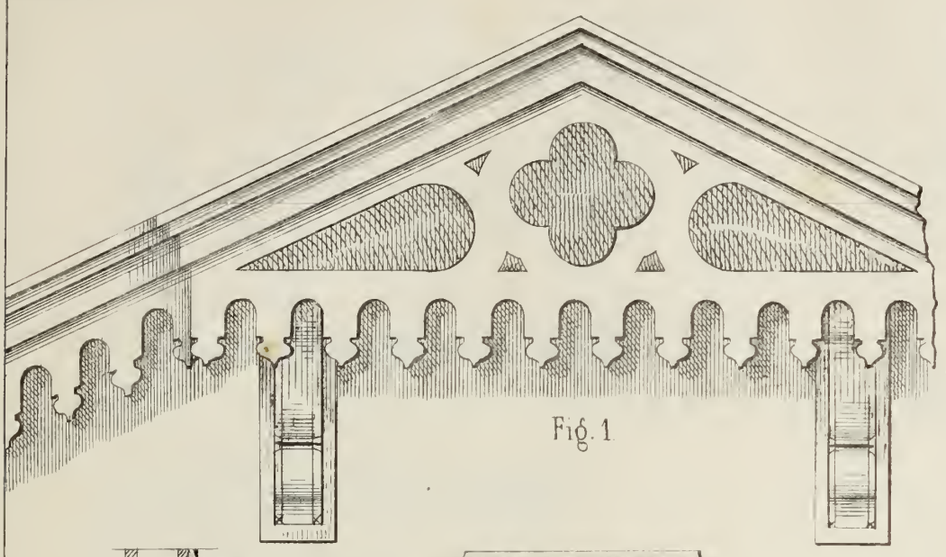


Fig. 1

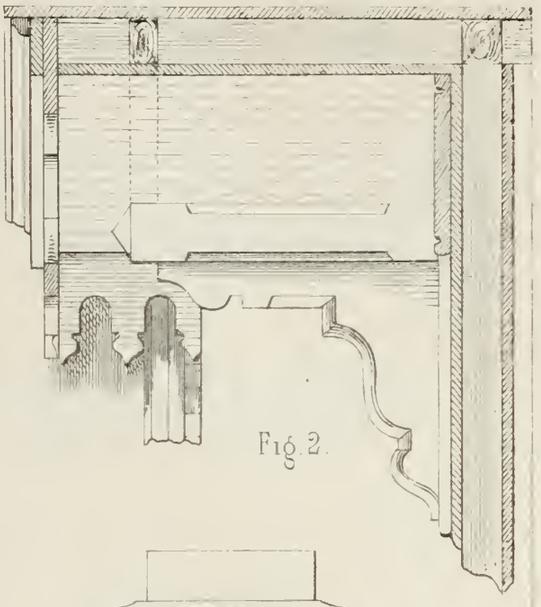


Fig. 2

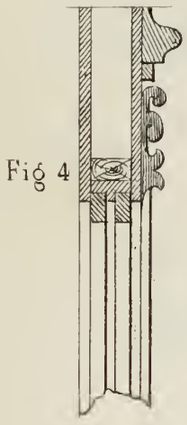


Fig 4

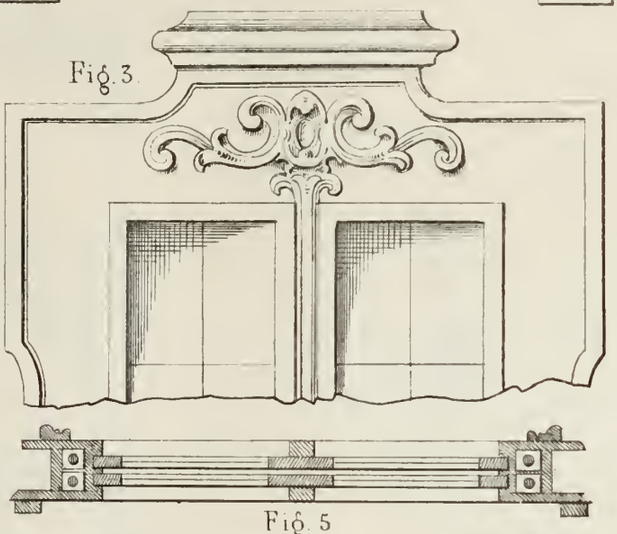


Fig. 3

Fig. 5

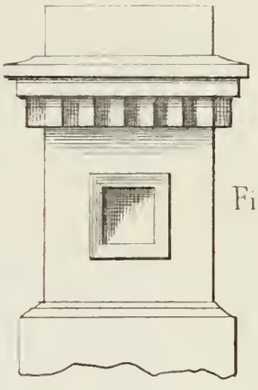


Fig. 11

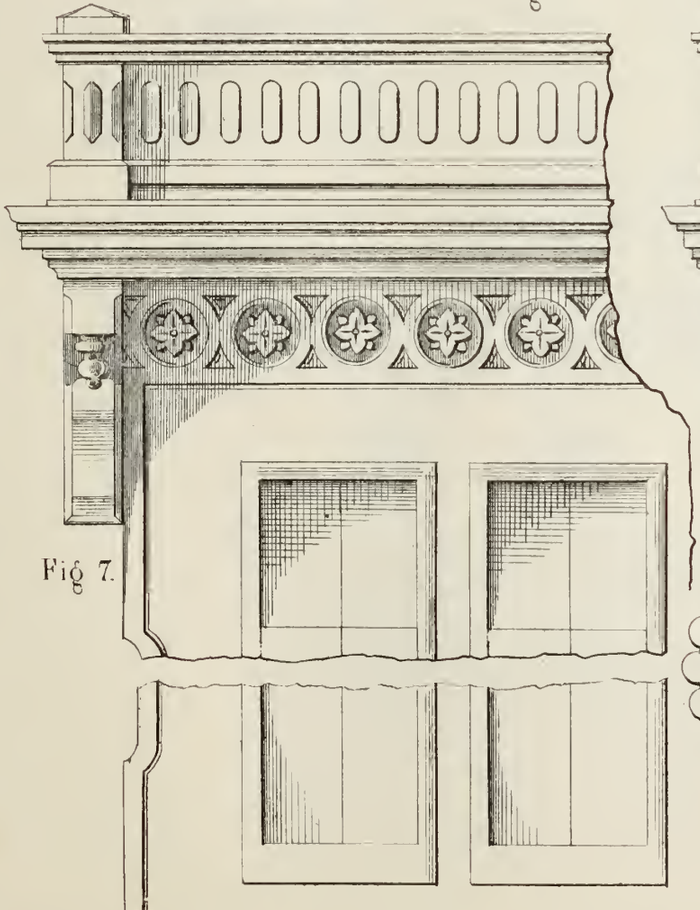


Fig. 7.

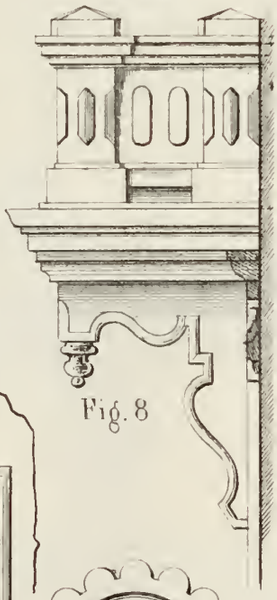


Fig. 8

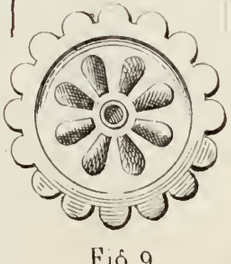


Fig. 9.

Fig. 10

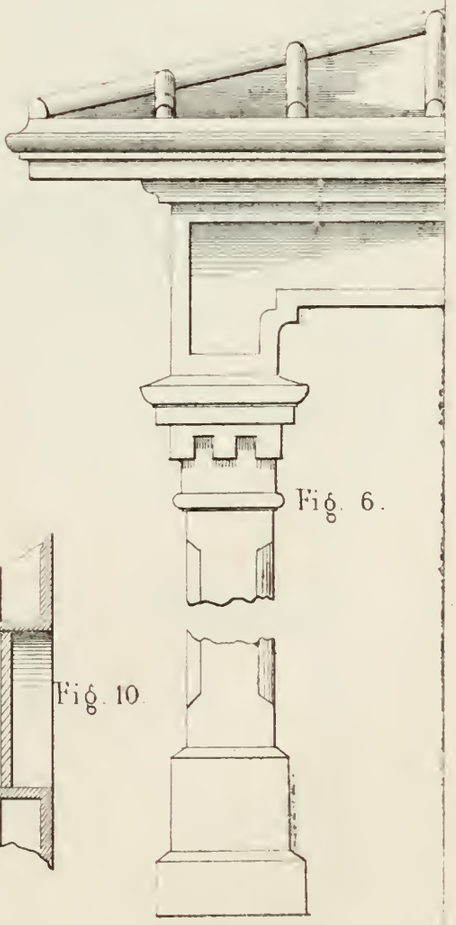


Fig. 6.

Sam[l] Sloan Arch[t]

P. S. Duval's Steam Lith. Press Phila.

DETAILS.

Fig. 1

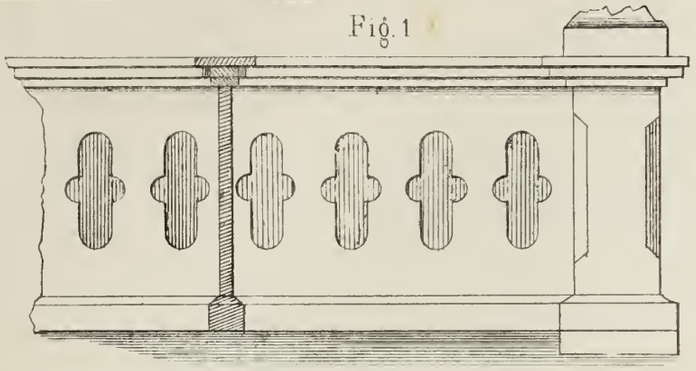
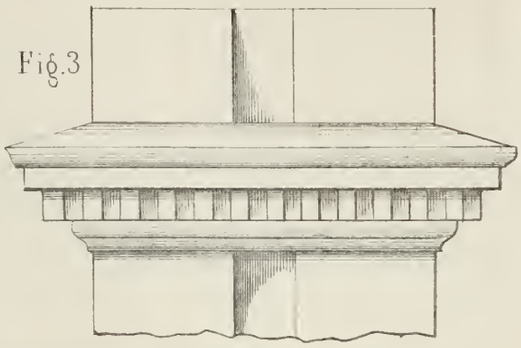


Fig. 3



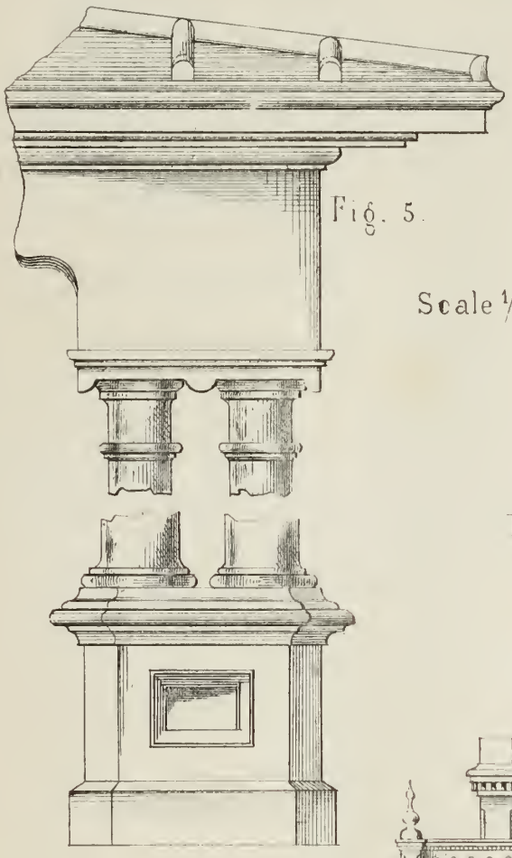
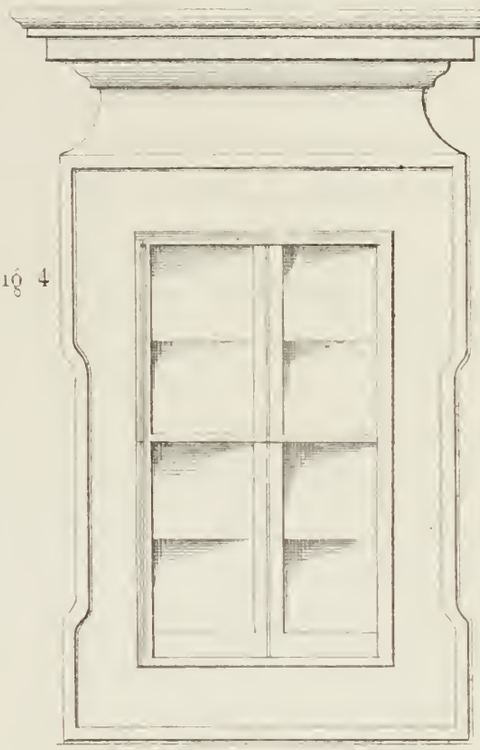


Fig. 5.

Fig 4



Scale ½ inch to the foot

Fig 2.

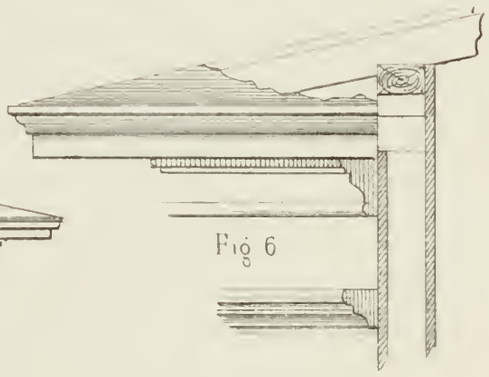
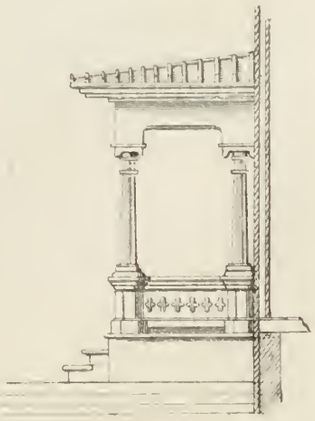


Fig 6



Scale, 1/8 of an inch to the foot

FRONT ELEVATION

Sam[l] Sloan Arch[t]

DETAILS.

P. S. Duval & team lith press Phil

SCHOOL-HOUSES.

UNTIL recently little attention has been given to the subject of School-houses. Throughout the length and breadth of the country our 'practical' people have for some time past condescended to bestow a few rude touches of architectural art upon their buildings. First, upon the principal public buildings, inasmuch as the additional expense was not immediately felt, and also because their dignity and importance seemed to demand it. Next, pride and the love of comfort materially added to the conveniences and improved the appearance of dwellings. Last, as though least, the School-house begins to exhibit traces of having received some of the attention which is its due. It would be curious to inquire into the cause of this neglect; but at present we have only to do with the fact, which we may venture to say lives in the memory of every one when he thinks of his school-boy days, unless perchance he was so highly favored as to be sent to some aristocratic select school. But we who were not thus favored well remember the dilapidated building, with only one room, standing on the cheapest lot in the neighborhood, and perhaps without any enclosure. We know how hot it was in summer, how damp in wet weather, how cold in winter, with the wind pouring in chill streams through innumerable crevices; or it may be that a red stove kept the close room hot, and the air, breathed over and over again, became putrid and disgusting. But chiefly we remember when perched on the high, hard, backless bench how we would long for the hour of letting out, with what delight we would escape from the pseudo penitentiary, what little pleasure Monday morning brought, and how each day intervening the vacation was carefully numbered. There is in an old spelling book this sentence, "Boys hate study," and once we thought that nothing indeed could be more true; but now we know that it was not so much the study that excited dislike as its unpleasant associations.

But these facts and their causes, though with us as household words, have not until lately found their way into print. The Genius of Improvement at last reached the School-house and found great room for exercise. There is now lying before us the results of systematic and official inquiry into the state of the schools throughout New England and the Middle States, giving testimony to their bad condition. They are the reports of various committees of examination, which, when published, at once brought to public view the undesirable state of things. Some of the details are shocking and almost incredible. We have no space for these, but can introduce only a few facts which were perhaps general. In the report to the Legislature of New York by the Hon. Samuel Young, we find the following:

"One-third only of the whole number of School-houses visited, were found in good repair; another third in ordinary and comfortable condition, only in this respect—in other words, barely sufficient for the convenience and accommodation of teachers and pupils; while the remainder, consisting of three thousand three hundred and nineteen, were to all intents and purposes unfit for the reception of man or beast."

The report of Hon. Horace Mann, secretary of the Board of Education in Massachusetts, for 1846, says—

"For years the condition of this class of edifices, throughout the State, had been growing worse and worse." "In 1837, not one-third part of the Public School-houses, in Massachusetts, would have been considered tenantable by any decent family, out of the Poor-house or in it." Again: "At the time referred to, the School-houses in Massachusetts were an opprobrium to the State; and if there be any one who thinks this expression too strong, he may satisfy himself of its correctness by inspecting some of the few specimens of them which still remain."

The First Annual Report of the Secretary of the Board of Commissioners of Common Schools in Connecticut, for 1838–39, contains the following:

"I will say generally that the location of the School-house, instead of being retired, shaded, healthy, attractive, is in some cases decidedly unhealthy, exposed freely to the sun and storm, and nearly all on one or more public streets, where the passing of objects, the noise and the dust, are a perpetual annoyance to teacher and scholar—that no play-ground is afforded for the scholar, except the highway—that the size is too small for even the *average* attendance of the scholars—that not one in a hundred has any other provision for a constant supply of that indispensable element of health and life, pure air, except the rents and crevices which time and wanton mischief have made—that the seats and desks are not, in a majority of cases, adapted to children of different sizes and ages, but on the other hand are calculated to induce physical deformity and ill health, and not a few instances (I state this on the authority of physicians who were professionally acquainted with the cases,) have actually resulted in this—and that in the mode of warming the rooms, sufficient regard is not had either to the comfort and health of the scholar, or to economy."

We cannot insert more, though there is an abundance. The School-houses of Pennsylvania and those, generally, throughout the South and West were, if possible, worse. Although there is, as before stated, a decided movement for the better, still this state of things is by no means as yet extinct. The "old field school" is still kept in a log hut, and has benches made of timber slabs. The site generally selected for the School-house is that wanted for nothing else. In the country, it is seated in the wild woods, without enclosure and without any other clearing than the highway which runs immediately before the door. In villages, it is either in some back alley or in a hollow. The building itself is seldom better than the barns within sight. It is often a mere log hut having of course but one room, and that without a ceiling. More generally it is a frame building, as plain as possible, destitute of window shutters and always having broken glass. The winds rock it to and fro, and the cracked plastering, the innumerable chinks and various ingenious carvings of the boys, give evidence of its dilapidated condition. The school-room is either so small and crowded as to be uncomfortable, or so large as to be comfortless. It is often so low that an ordinary man may touch the ceiling; thus in Rhode Island, the height of over two hundred school-rooms averaged less than eight feet. Sometimes it has a stove and sometimes an open fire-place, we cannot say is warmed

by either, for the wind whistling through the cracks forbids. In this, however, we do injustice to many where the stove is kept shut, until the air is almost enough to stifle a Hottentot. None are ever provided with means of artificial ventilation by which the air may be kept uniform in purity and temperature, but when it becomes so impure and so contaminated with smoke as to be positively insupportable, the window is raised, and in pour colds and consumption.

Public attention has happily at last been aroused. Horace Mann says, that there was one argument used by the advocates of reform with irresistible effect. The meeting of the voters on the question of erecting a new School-house was called in the old one. "Cold winds, whistling through crannies and chinks and broken windows, told with merciless effect upon the opponents. The ardor of opposition was cooled by snow-blasts rushing up through the floor. Pain-imparting seats made it impossible for the objectors to listen patiently even to arguments on their own side, and it was obvious that the tears they shed were less attributable to any wrongs they feared than to the volumes of smoke which belched out with every gust of wind from broken funnels and chimneys. Such was the case in some houses. In others, opposite evils prevailed; and the heat, and stifling air, and nauseating effluvia were such as a grown man has hardly been compelled to live in, since the time of Jonah." Such arguments were indeed cogent, and we now see their effect in the many comfortable and convenient School-houses newly built or building around us. But the stone has just struck the water, and the circles are not yet spread. In the principal cities and towns only does reform exist, but as information is disseminated through the press, and as models are presented, so much the more rapidly and widely will improvement extend.

A word may be said as to what School-houses should be. The best situation in a village is not on the principal street, nor on the most worthless lot to be had, but in some quiet, respectable neighborhood where there is little or no stir out of doors to distract the attention of the inmates. The building should always be enclosed with a yard large enough for a playground, and be surrounded by shade trees. In the country there should be no more trees around than are necessary for a pleasant shade, and in all cases it should have a high, dry and healthy site, protected by a hill-side or a grove of evergreens from the bleak north winds.

The building, if the means at hand will not allow of its being made attractive, should certainly not be repulsive in its external appearance. The internal arrangement and conveniences of course are of the first consideration, but every effort should be made to give it as much architectural effect as possible. Without detailing the results of this, we may say generally that it reacts as a public benefit; it makes going to school more pleasant, and every tasteful moulding, every carving impresses the mind, and is in itself a schoolmaster. Of the interior the same holds true, and it should therefore be finished in the most tasteful manner possible. It is a notorious fact, that in Europe valuable statuary and paintings may be exposed unguarded to public gaze, and they will never be touched. There nothing is carelessly injured. It is equally notorious that Americans deface everything they can reach with a knife or pencil point. Where is

this learned but at School? There is not one School-house in a thousand that is not covered with marks and carvings, oftentimes so obscene as to have a polluting effect on the susceptible minds of children. This is best avoided by giving every thing the highest finish, for the mind naturally shrinks from injuring that which is beautiful and produced by labor and pains-taking, and then, too, if the injury is done, it becomes a more punishable offence.

A school-room should never be less than twelve feet high, it should have about as much vacant as occupied space on the floor and should be well lighted. There should be other apartments for the purpose of entry, for the stairway and for the deposit of loose clothing. The furniture should always be conveniently designed and arranged. Every possible attention should be paid to the comfort of both teachers and scholars. If both sexes are taught in the same building, they should be separated by being in different stories or apartments, there should be different places for entry and distinct conveniences throughout.

It may be thought entirely superfluous to say that the construction of the building should be sound in every part. On the evening of April 28th, 1851, the ceiling of the Southwest School-house in this city, fell bodily to the floor. We were called upon to examine it, and found that the ceiling joists had been attached to the beams by tenpenny nails, in such a way that the mere weight of the plastering, laths and joists brought the whole down. Had the fall occurred during school-hours, in all human probability, seventy little children would have been crushed to death. On examining further the building, the wall was found to have so separated, the facing from the body, in consequence of its not being well bonded, that it barely gave sufficient support to the floors and roof. The terrible calamity which occurred in the School-house on Greenwich Avenue, New York, on the 20th of Nov. 1851, is still fresh in painful recollection, and would not have occurred had the stairway been properly designed and the bannisters been constructed with a proper degree of strength. A panic, that strange cloud of ignorant fear which overshadows the reason and leaves only instinct and the body active, came upon the children. They crowded on the stairway, the bannisters broke, and for some time a living stream poured over the brink, down the well, and dashed itself on the stone floor, piling up a mass of quivering flesh and bones. We need mention no more than this one horrible affair to show the necessity of careful attention to construction, and the folly of those who build with the least possible expense of labor and material.

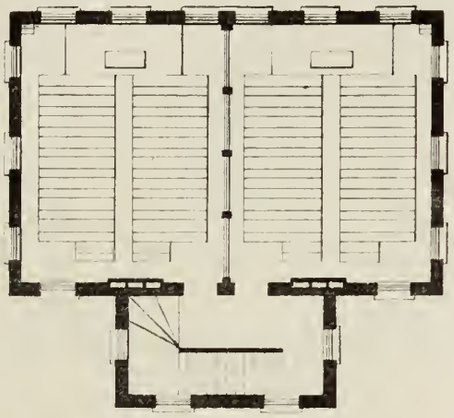
The best methods of warming a School-house are those which apply to other buildings. We have no space to discuss this point now, but in a future article will speak of it at large. The great desideratum is to secure a large and steady influx of moderately heated air, which in large rooms is best done by means of a cellar furnace. Stoves may be so constructed and managed as to attain the same end very effectually. But ventilation is a point of equally great importance and has received heretofore little or no attention. So long as open fire-places were used the chimney acted to this end, but now when our best constructed rooms are made almost air tight, it must be otherwise provided for. In three hours the air in the largest of our school-rooms, with its ordinary complement of scholars, would become so vitiated as to be utterly unfit

Sam[l] Sloan, Arch[t] P.S. Duval's Steam lith. Press Phil[a]

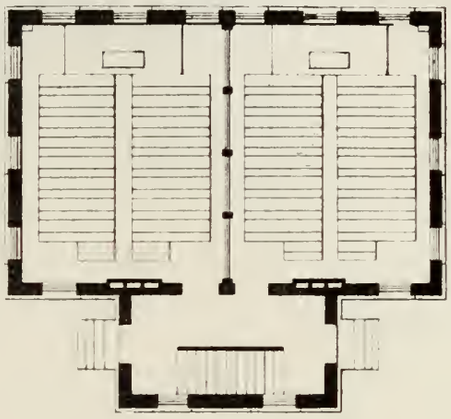
FRONT ELEVATION.

Sam[l] Sloan Arch[t] P.S. Duval Steam lith. Pr[s] Phil[a]

SCHOOL HOUSE.

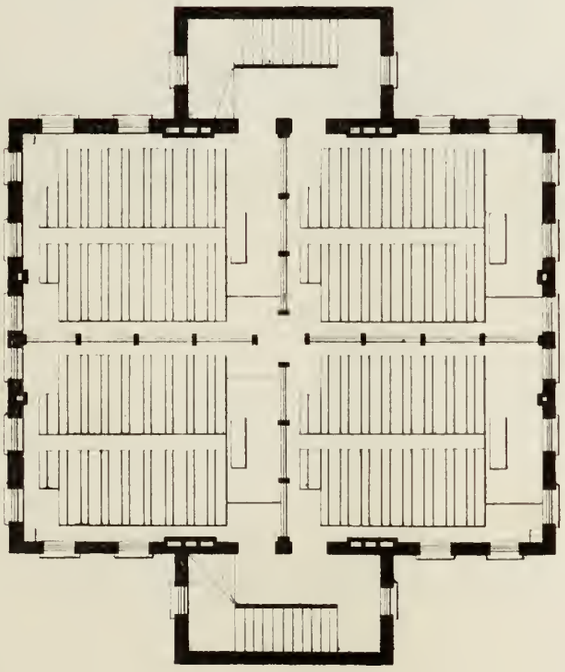


SECOND STORY.

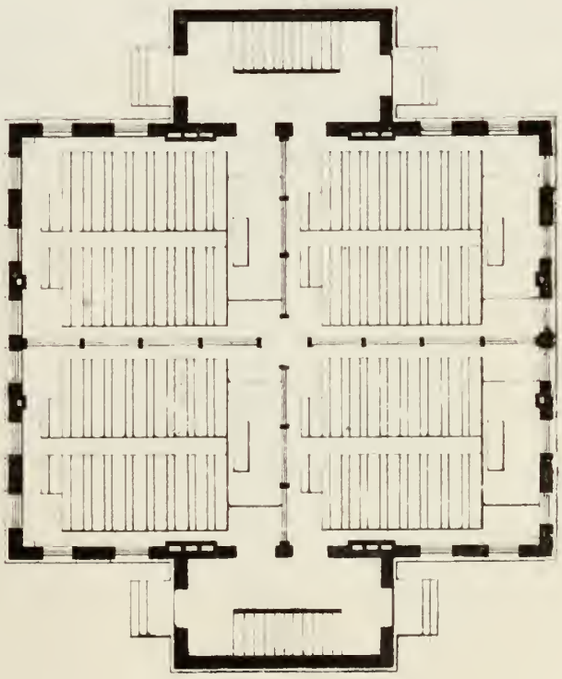


FIRST STORY.

DESIGN ENLARGED.

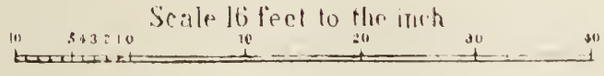


SECOND STORY.



FIRST STORY.

Scale 16 feet to the inch



GROUND PLANS.

P. S. Duval's Steam Job Press Philad.ª

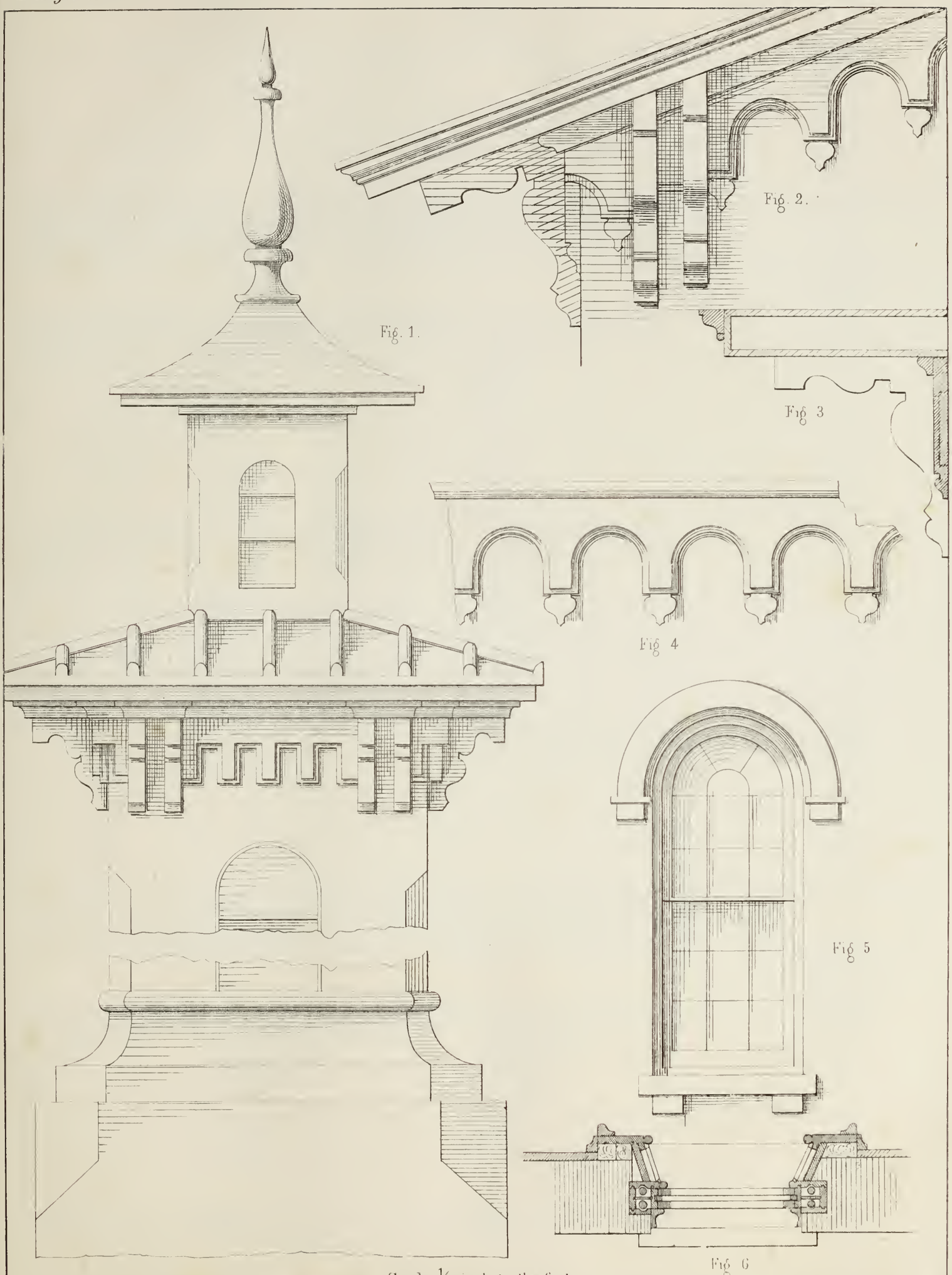


Fig. 1.

Fig. 2.

Fig 3

Fig 4

Fig 5

Fig 6

Scale, 1/2 inch to the foot.

DETAILS.

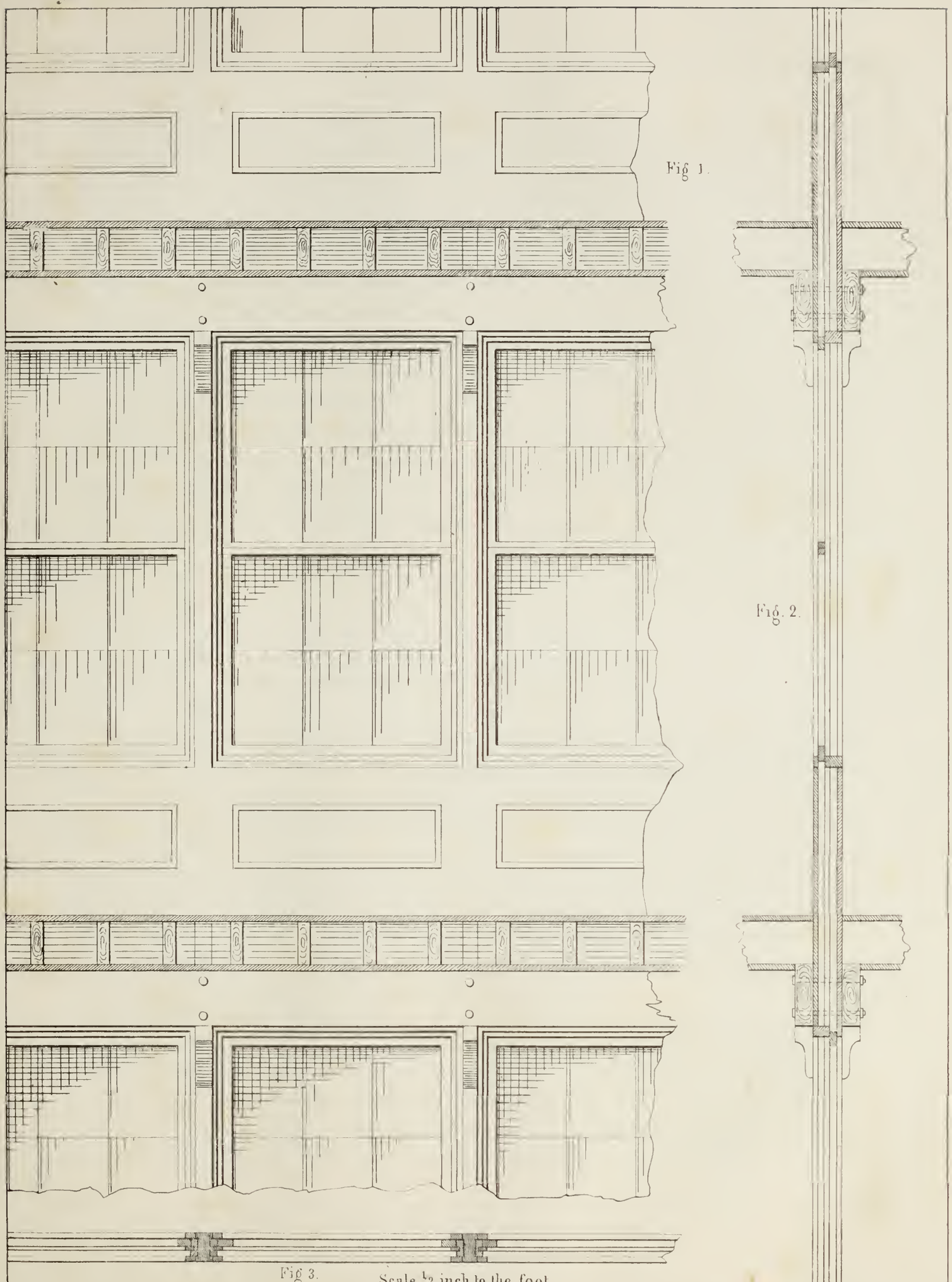


Fig 1.

Fig. 2.

Fig 3.

Scale $\frac{1}{2}$ inch to the foot.

P S Duval's Steam lith press Philad^a

DETAILS.

for the purposes of respiration. This is no guess work, but a fact calculated upon scientific principles. The effect, where this even partially occurs, is to stupify the brain and produce a total disinclination to physical or mental labor, too certainly planting disease. Plans for ventilation will also be discussed in future.

It is hardly necessary to urge further the improvement of School-houses. Probably we will give hereafter, in another form, an extension of our views on this subject, but at present enough has been said to show its importance. When we reflect on the plastic and susceptible nature of the youthful mind and body, the tenacity with which in after years it retains early impressions and influences, how desirable it appears that we should surround this stage of life with the most pleasant and healthful associations. Should the School-house be a place of both mental and physical torture? It is indeed too frequently so, our most painful recollections being oftentimes connected with it. Certainly we should desire our children to pass the few years they are subject to us, the naturally pleasantest portion of life, as happily as possible; but in the usual condition of things, no wonder they grow up with an utter dislike to mental labor, since connected with it they have been accustomed to such circumstances as would degrade and break the spirit of a man, and the influence of which it requires all the buoyancy of youth to resist.

A SCHOOL-HOUSE.

DESIGN SEVENTEENTH.

In the latter part of the year 1850, the Board of Controllers of the Public Schools in the city and county of Philadelphia, made a public proposal for designs for School-houses. They subsequently fixed upon those offered by the author, and since that time have been busily engaged in erecting buildings on these plans. Up to this time the arrangements for the accomodation of the various schools have been indifferent, and in some cases decidedly bad. Oftentimes they have been kept in rented buildings, erected for other purposes entirely, in one of which, during January, 1852, the ceiling fell, fortunately during the night, but had it fallen in school hours the disastrous consequences would have been equally great with those mentioned in the previous article, in connexion with a similar accident. In another of these rented buildings a school of over one hundred children has been kept in a room destitute of ventilating apparatus, and having only one dark narrow stairway as a means of egress. These defects in the system the Board have taken most prompt and energetic measures to remedy, and have now determined to erect new buildings wherever there is any need.

The design which was adopted as aforementioned, we now lay before our readers. An elevation and perspective suited to the plan are exhibited on Plates LXVII. and LXVIII., the ornaments of which are taken from the Norman style.

The most important feature, however, is the mode of partitioning; this may be seen on Plate LXIX. of ground plans, and on the second plate of details. It consists of dividing the building into the requisite number of school-rooms by means of glass partitions, which are so arranged, (see the specification,) that the whole story may be thrown into one room, and thus the various divisions of the school may be taught separately or together, as desired. Each apartment is intended to

accomodate about sixty scholars. On the upper part of the plate are the plans to which the specification refers, and below we exhibit plans of the same design, doubled in size. In this the rooms communicate through the opening in the centre by means of four glass doors. The means of egress in both are ample. The cost of the buildings on the first plan is $4000, of the second $7000

On plate LXX. are the details of the outside. Fig. 1, the belfry. Fig. 2, the cornice, corbel course and eave bracket. Fig. 3, is the pediment bracket. Fig. 4, corbel course of the eaves. Fig. 5, window. Fig. 6, section of the window.

Plate LXXI. shows the construction of the partitions. Fig. 1, is a front view, drawn as if for a three story building, and shows a section of the floors. Fig. 2 is a vertical section. Fig. 3, a horizontal section.

SPECIFICATION

Of the workmanship and materials to be used in the construction of a new School-house, situate, &c.

GENERAL DIMENSIONS.—The building is to be forty-two feet six inches front, by twenty-five feet six inches deep, and two stories high. The vestibule is to be externally twenty-four by ten feet six inches, and the roof is to have four feet pitch. The first story is to be thirteen feet one inch and a half to the top of the second story floor, and the second story is to be twelve feet in the clear. All other dimensions must be taken from the accompanying drawings.

EXCAVATION.—The cellar must be, throughout the entire extent of the building, seven feet deep below the underside of the first floor joists. The trenches for the foundation must be at least one foot deep below the cellar bottom. The earth from the cellar is to be graded about the premises as may be directed.

MASONRY.—The foundations or cellar walls, as high as the first tier of joists, are to be two feet thick. The walls above, as high as the second tier of joists, are to be twenty two inches thick, and to the third tier or square of the building are to be eighteen inches thick, and those of the tympanums are to be sixteen inches thick. All these walls are to be built of good quarry building stone, the first course of the foundations is to be of large flat stone well, and solidly bedded in mortar. The mortar must all be composed of good coarse sharp sand and wood burnt lime, in such proportions as will ensure a good cement. All facings are to be smooth dashed with the same material and those of the cellar are to be lime-washed.

CUT STONE.—A base course of the best hewn stone is to extend around the building two feet eight inches high, projecting two inches from the face of the wall, with a wash on the top. The two outer door sills are to be four feet two inches long, one foot six inches wide and eight inches high. There is to be a platform step to each, four feet eight inches long by two feet six inches wide, and two steps of the same length and one foot tread; each rise is to be eight inches high. All the above is to be blue marble, clear of all defects and chamfered where necessary.

BRICK WORK.—There are to be three piers in the cellar, built of brick eighteen inches square, of height sufficient to give support to the girders, and situate immediately beneath the partition posts. The warm air and gas flues are also to be constructed of sound brick, well pargetted within. The gas flues must be topped out with sound brick at least three feet above the roof. There is also to be a case of brick work built in the cellar, having two four inch walls, four inches apart, for the reception of a furnace. The cold air ducts are to be constructed of bricks under ground, communicating with the external air at the nearest accessible point.

CARPENTER WORK.—The joists of the first story are to be three by twelve inches, spruce pine of good quality, placed sixteen inches between centres, and well backed with one inch crown, each tier having two courses of herring bone bridging through the centre. These joists are to be supported by two girders fixed across the building, six by twelve inches each, and placed six inches apart. These girders are to rest upon the brick piers built for the purpose in the cellar to the proper height. They are to be bolted together with three quarter inch iron bolts, two over each pier, passing through the ends of iron posts, placed over the piers to support the partition, and are to rest upon iron brackets cast on the posts beneath. The joists of the second story are to be of the same dimensions, backed, bridged, &c., as last mentioned, but of hemlock and placed twelve inches between centres. The girders are to be entirely similar to those below, bolted in the same way. The ceiling joists of the second story are to be of hemlock, two by ten inches, bridged and placed sixteen inches between centres. They also will rest upon girders bolted and placed similar to those below, which are, however, but four by twelve inches. The posts of the second story, which are of wood, and in position and size correspond with the iron posts of the first story, must extend to the roof and be framed into the ridge piece in front of the belfry, and into the rafter opposite on the rear. The rafters of the roof are to be three by five inches, placed two feet between centres, strongly framed and put together in the most substantial manner. These rafters are to be overlaid with hemlock board, free from knots, firmly nailed to the rafters, and otherwise prepared for metal. The floors are to be one inch and a quarter heart pine boards, well seasoned, well worked, tongued and grooved, and firmly nailed to the joists, the joints being afterwards shot.

STAIRS.—The steps are to be composed of one inch and a quarter heart pine step boards, four feet six inches long, each step having eight inches rise and eleven inches tread. They are to be enclosed by a partition formed of one and a half inch boards, grooved, quartered and beaded. There is to be a wall rail secured to the partition in the usual way. The opening in the second floor is to be surrounded by a strong rail, closed beneath to correspond with the wainscoting, and not less than four feet from the floor. There are to be stairs to the cellar, beneath the main stairs, put together in the usual manner, and also a step ladder to the loft.

DOORS.—The outside doors are to be one inch and three quarters thick, each having six panels with bead and butt, and being hung with three four by four inch butts, and secured by seven inch upright mortice locks. The frames are to correspond with those of the windows, the tympanum of the arch being glazed. The inside doors are to be one inch and a half thick, having six panels with bead and butt, and being hung with three and a half by three and a half inch butts, and secured by four inch mortice knob latches. The cellar door outside is to be beneath one of the windows as may be directed, the opening being three feet six inches broad by four feet out, having a stone head and sill and eight inch cheeks. The door is to be in two parts, strongly put together with wrought tenpenny nails, and to have white lead in all the joints. They are to be one inch and a quarter thick with three battens, each six inches wide, hinged with hooks and straps and secured by a hasp and padlock.

WINDOWS.—All are to be alike in construction. The sash are to be one inch and a half thick and double hung with axle pullies and patent cord. There are to be shutters within having two folds to each jam, and cut half way up opposite the meeting rails of the sash. These shutters are to be hung with back flap hinges, and are to fold into soffits formed in the jambs for their reception. They are to be one inch and a quarter thick, with two panels to each division, the stiles not being over one inch and three fourths in width. The frames are to be reveal with clean heart pine sills. The cellar windows are to have sash hinged to a narrow frame and secured with a small bolt. Each opening is to have three iron bars without, built in the wall. There is also to be a circular window, as shown on the front elevation, having a pivot sash, to light the loft.

PARTITION.—The partition is to be constructed as shown upon the detail drawings. The sash are to be one inch and a half thick, and hung to balance each other, with patent cord passing over one pair of axle pullies to each window, so that as the lower sash descends the upper one will ascend. The wainscoting will receive the lower sash and the upper will pass into the wainscoting above. There are to be three iron posts in the first story, and three wooden ones in the second, corresponding in appearance, to give support to the sash and girders.

DRESSINGS.—The dressings to the doors and windows are to be an architrave and moulding, in all eight inches wide. That of the windows is to be furred out at the jambs, giving sufficient space for the blinds. Outside there is to be a hood-mould over each opening, and a sill beneath, both of wood. All the rooms are to be wainscoted to the height of the window sills, properly secured, neatly capped and otherwise corresponding with the lower part of the partition exhibited on the plate. The wall next the stairs is to have wainscoting passing up the entire distance of the stairway. In each vestibule there are to be at least two hundred and fifty clothes hooks secured to wall strips, as may be directed. The cornice brackets, &c., are to be constructed according to the drawings. The belfry is to be put together strongly of light materials, for the reception of the bell, placed at the junction of the roofs, and finished as detailed on the plates.

VENTIDUCTS.—Each room is to have a wooden ventiduct placed in the angle diagonally from the warm air flues, made of thoroughly seasoned lumber, nine by fourteen inches outside, smooth on all sides and grooved together with white lead in joints, so as to be perfectly air tight. Each duct is to have two openings equal to its capacity, one near the floor and the other near the ceiling. The first will have a tight door, hinged below to drop inwards, and the one at the ceiling will revolve and be so arranged as to be moved at pleasure by means of a cord. These ducts are all to connect immediately under the apex of the rear pediment, with one equal in capacity to all the four; this is to pass up to the roof and there be surmounted with one of Emerson's patent ejecting ventilators, of fifteen inch calibre.

PLASTERING, &c.—All the walls and ceilings are to have two coats of brown mortar and one of white hard finish. The mortar must be composed of good clean sharp sand and wood burnt lime, in such proportions as will insure firm smooth plaster. The laths must be sound and free from bark.

The exterior of the building is to be rough cast in the best and most approved manner, of such a tint as may be directed, and laid off in blocks, so as to appear like dressed stone.

DEAFENING.—The second floor must be deafened by nailing cleats to the sides of the joists, and then flooring them so that the surface of the floor will be three inches below the top of the joists. This space must be filled with coarse mortar.

PAINTING AND GLAZING.—All wood work within and without must have three coats of pure lead paint, mixed with the best linseed oil. The wainscoting throughout must be tinted and grained to represent old oak, and have two coats of varnish, so also the doors and door and window frames externally. The hood-moulds and sills must be tinted and sanded to represent stone. The cornice brackets and cupola must be of an approved tint.

All sash must be glazed with the best American glass, well bedded, bradded and back puttied.

IRON WORK.—The iron posts in the first story supporting the glass partitions, are to be three by six inches, including

the flanges. The bolts for the girders are all to be made of three-quarter inch round iron. A lightning rod is to be placed against the cupola, extending at least four feet above its highest point and terminating in a platinum point, the cost of which must not be less than four dollars. The lower part of the rod is to be welded to an iron bar one inch and a half square, which must be driven into the earth at least four feet. Provide all other iron work necessary to complete the building in a satisfactory manner.

TIN WORK.—The roof is to be overlaid with the best quality one cross leaded roofing tin, painted on both sides, the upper receiving two coats. Provide of the same material all necessary gutters and conductors to convey the water to the ground. The conductors must be three inches in diameter, with shoes and spout stones, and secured to the wall in a substantial manner.

FURNACE.—The building is to be warmed by one of Chilson's No. 5 furnaces, properly set in the brick case prepared for its reception in the cellar. The registers throughout are to be ten by fourteen inches, and the whole arrangement is to be completed in accordance with the latest improvements.

FINALLY.—The contractor is to furnish at his own cost and expense all the materials and workmanship necessary to complete the building in all its parts as above described, in accordance with the plans and details and to the satisfaction of the Board of Controllers.

AN ORIENTAL VILLA.

DESIGN EIGHTEENTH.

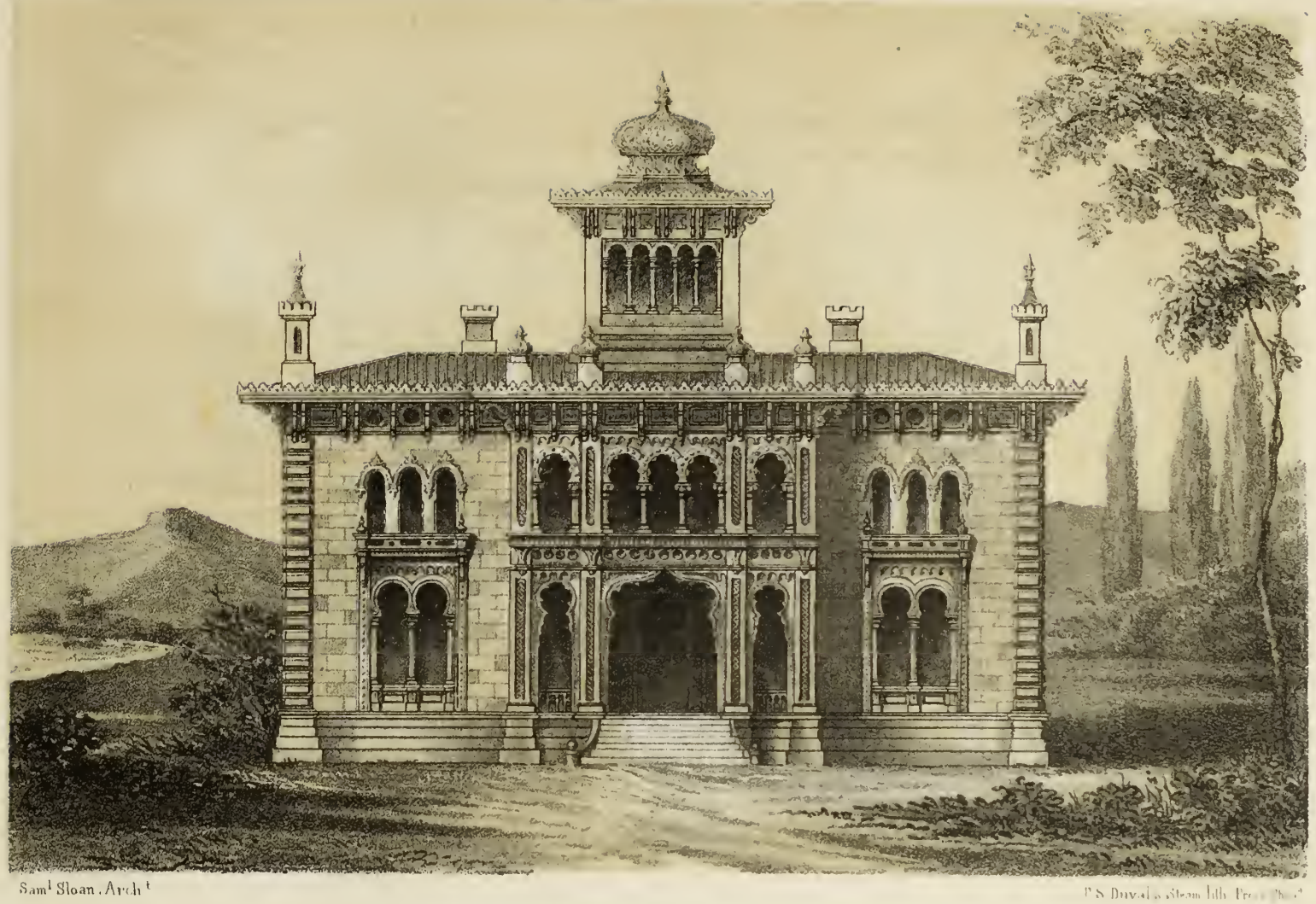
THE style of building which has prevailed among the most civilized nations of the East, and which was introduced by the Moors into Spain differs essentially from any other species of architecture. The horse-shoe arch and the minaret are the two most prominent distinguishing features, but throughout the whole style of finishing and the character of the embellishments are materially distinct, and it therefore possesses just claims to be considered a style in architecture. Every one whose judgment and taste may be considered as authority in these matters, speaks of this eastern style as beautiful, but the immense quantity of carving required in order to give it full effect, prevents it from being used to any great extent by us.

On Plate LXXII. we present the front elevation of a building which is ornamented with some of the characteristics of this style, and the plate below exhibits the rear elevation of the same building. It would be sheer folly to introduce the original pure style into this country, for no wise man will sacrifice his comfort in order to secure consistency in the appearance of his house with those which have been built in other countries, in other climates, and perhaps for other purposes by people with different customs. Our style of living is totally unlike that in the East, and were we to build just such houses as they have, we would certainly part with comfort. This last is of the first importance. Let every one arrange his dwelling so as to secure the greatest amount of convenience, and then exercise his judgment in decoration. We hold that, in a manner, each building is an independent being, and if it be consistent with itself both internally and externally, and as to its purpose, then no fault can be found with it on that score. Many buildings similar to the one here given have been erected in this country and command universal admiration. The best location would be on the banks of some of our noble streams, the Mississippi or the Hudson.

The ground plans of the design are exhibited on plate LXXIV. The drawing room and dining room communicate with the ante-room by wide sliding doors, so that on occasion the three may be thrown into one. The front part of this ante-room might be partitioned off so as to give a vestibule. In connexion with the library a fire-proof closet is arranged for the reception of valuable papers, books, plate, &c. The whole house is designed to be warmed by a cellar furnace,

Design XVIII.

Pl LXVII



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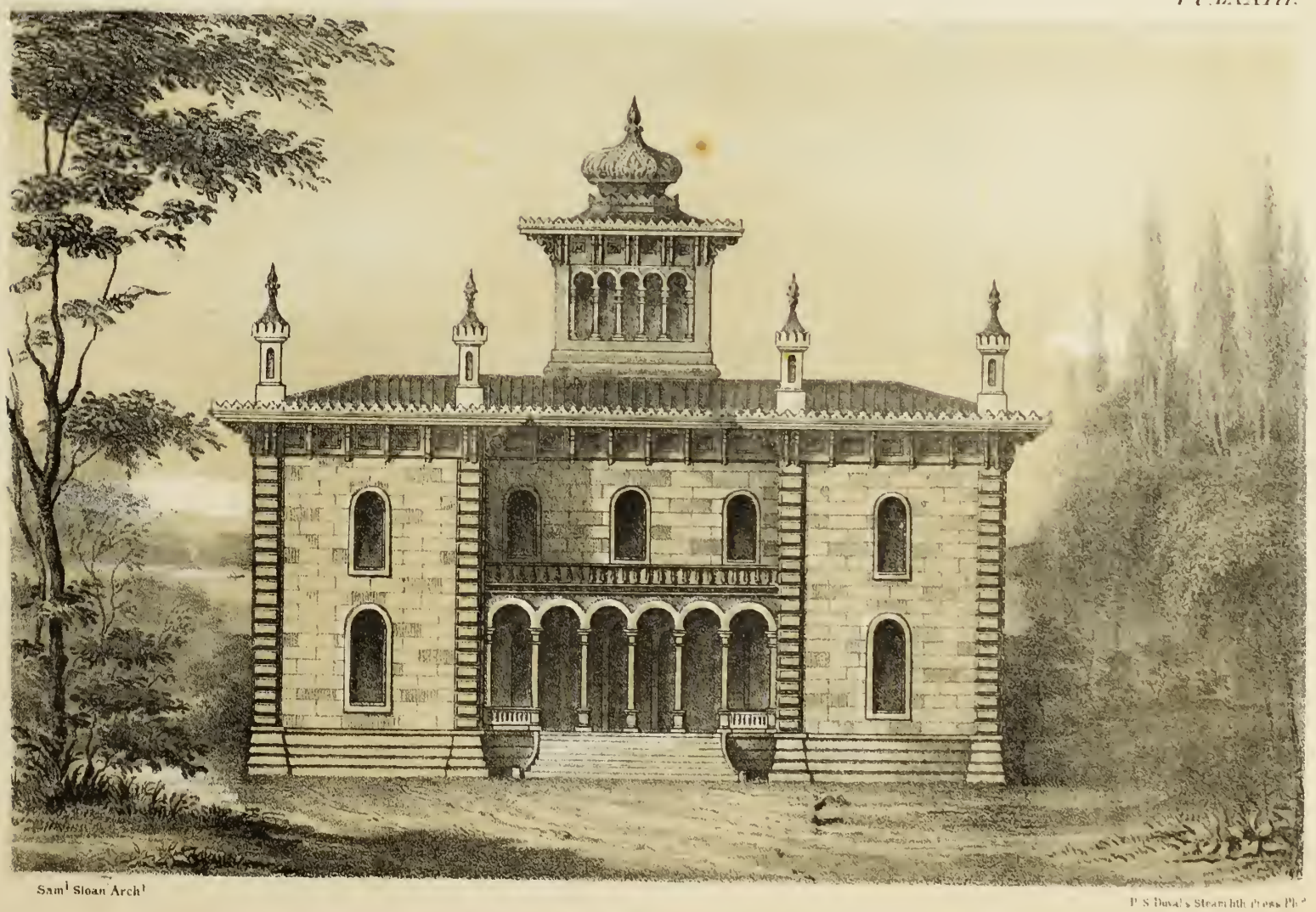
ORIENTAL VILLA.

Design XVIII

Pl LXVIII.



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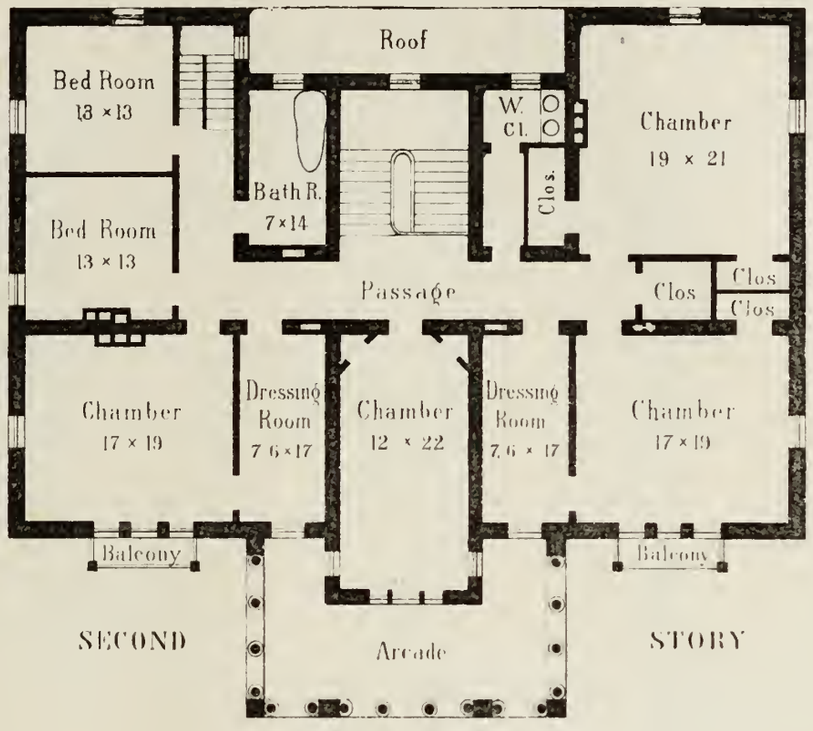
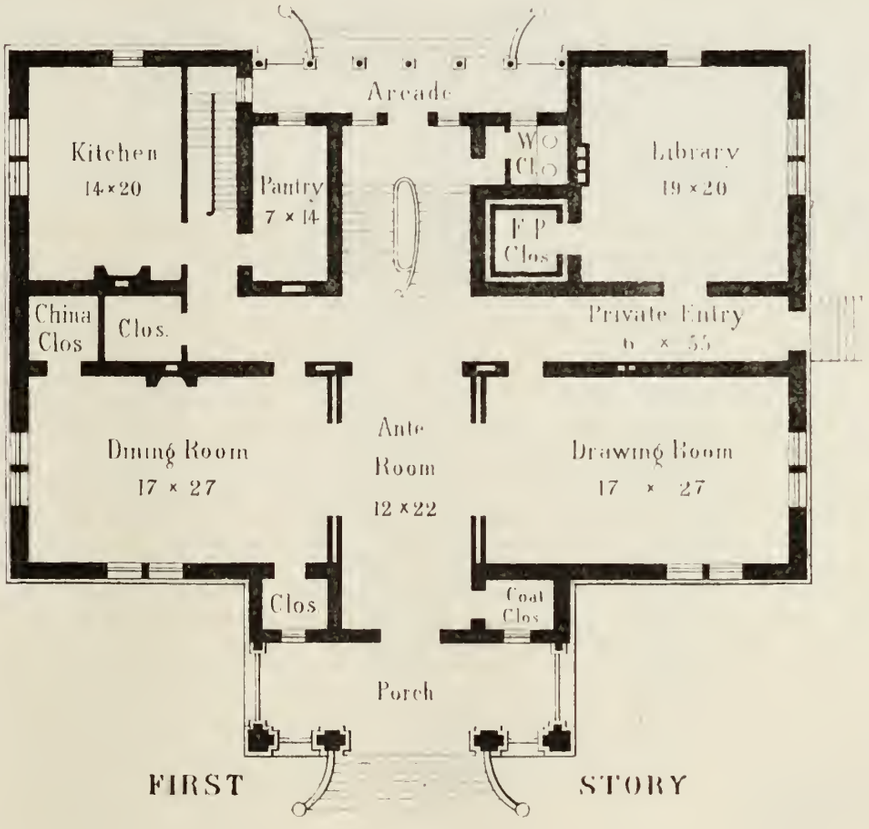
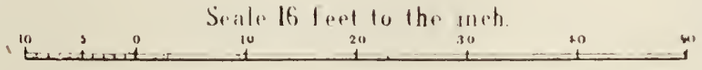
P. S. Duval's Steam lith. Press Phila[a]

REAR ELEVATION.





Scale 16 feet to the inch.



GROUND PLANS.

P.S. Duval's Steam Lith. Press, Phila.

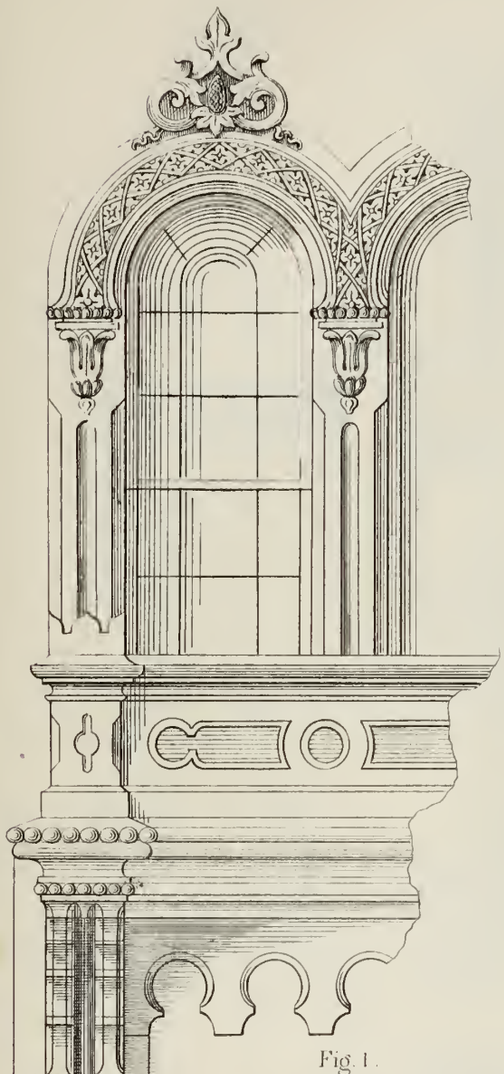


Fig 1.

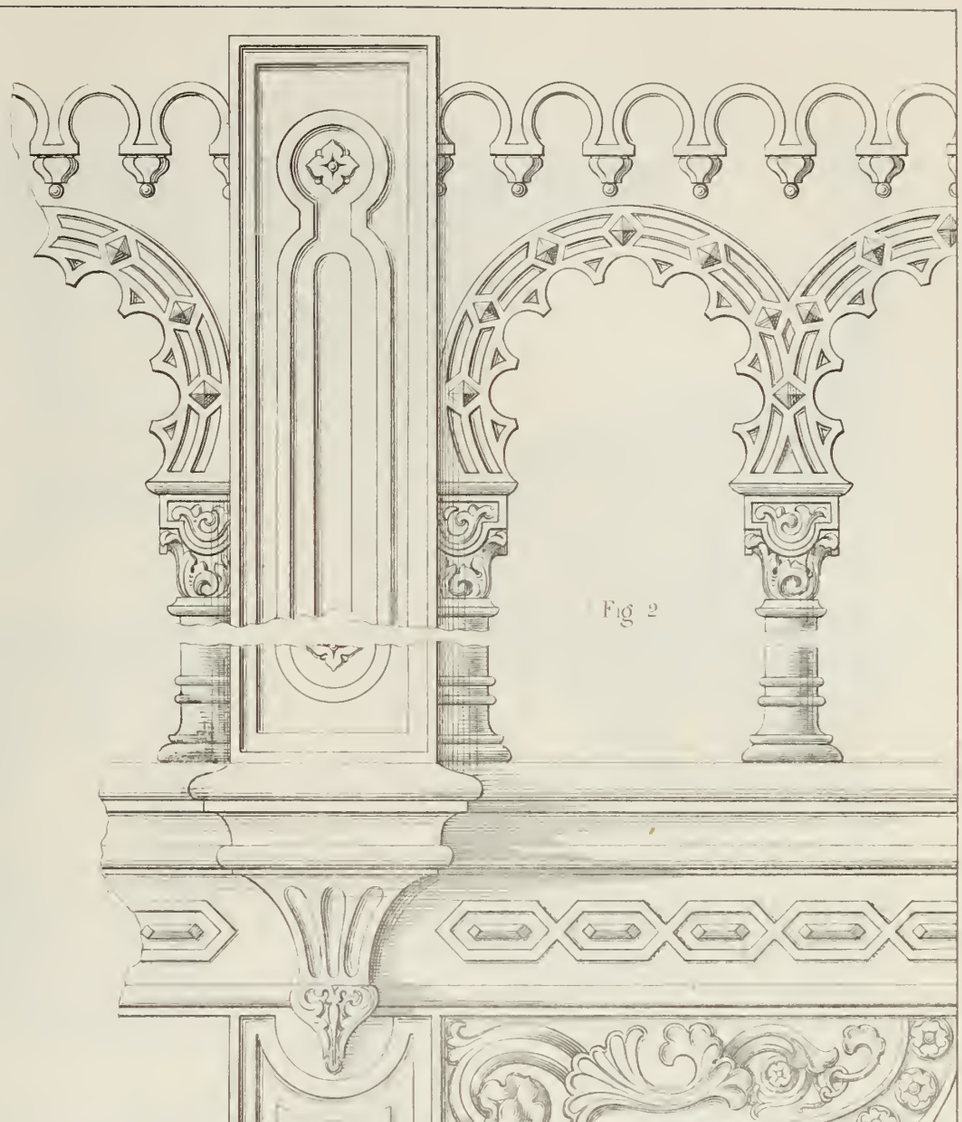
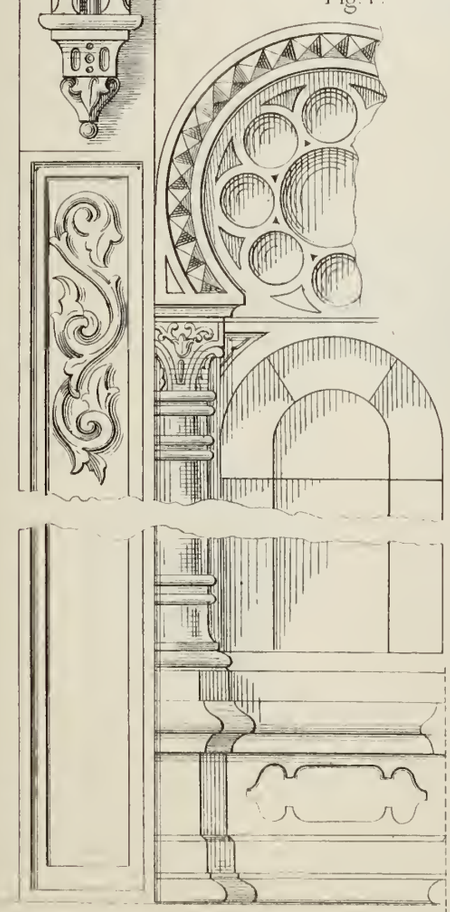


Fig 2



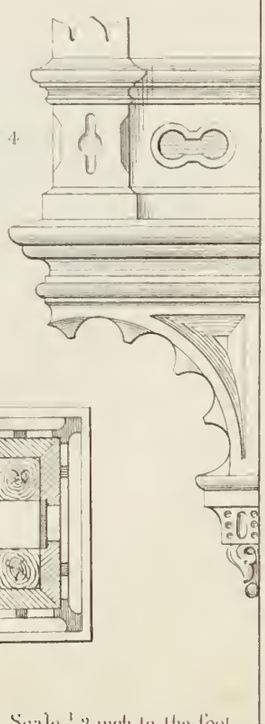


Fig 4

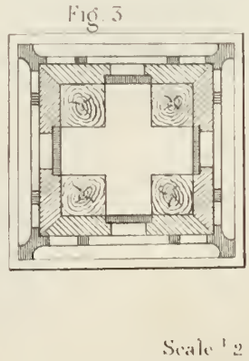


Fig 3

Scale 1 2 inch to the foot

Sam[l] Sloan Arch[t]

P. S. Duval & Steam Lith. Press Phila[a]

DETAILS.

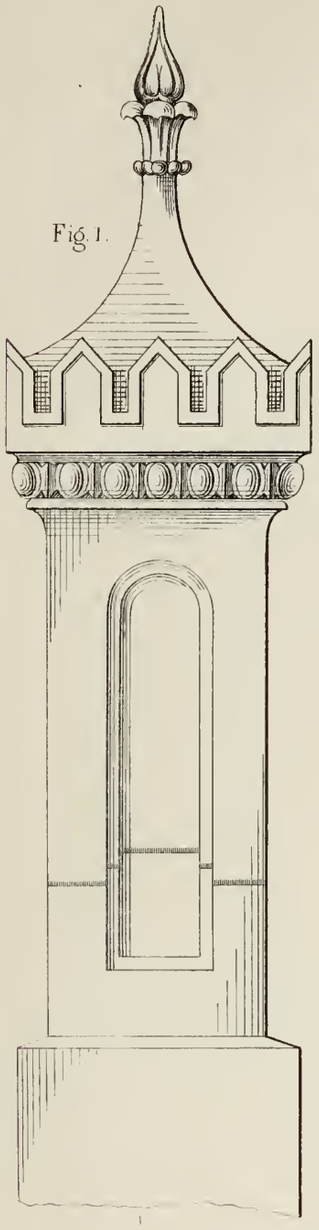


Fig. 1.

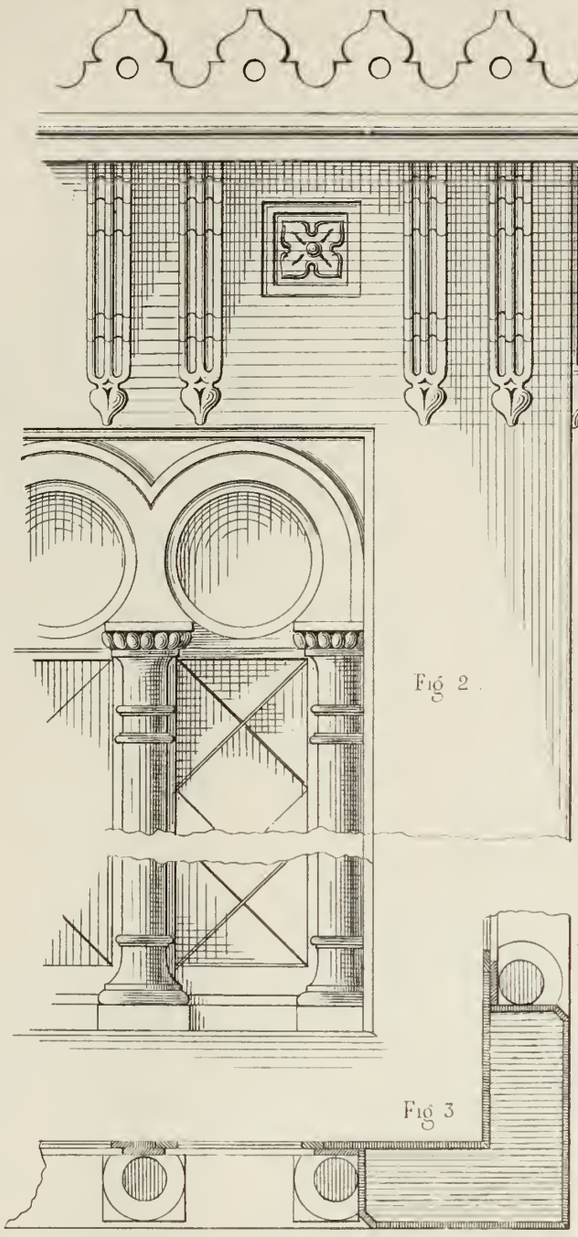


Fig 2.

Fig 3.

Fig 4.

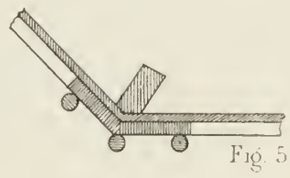


Fig. 5.

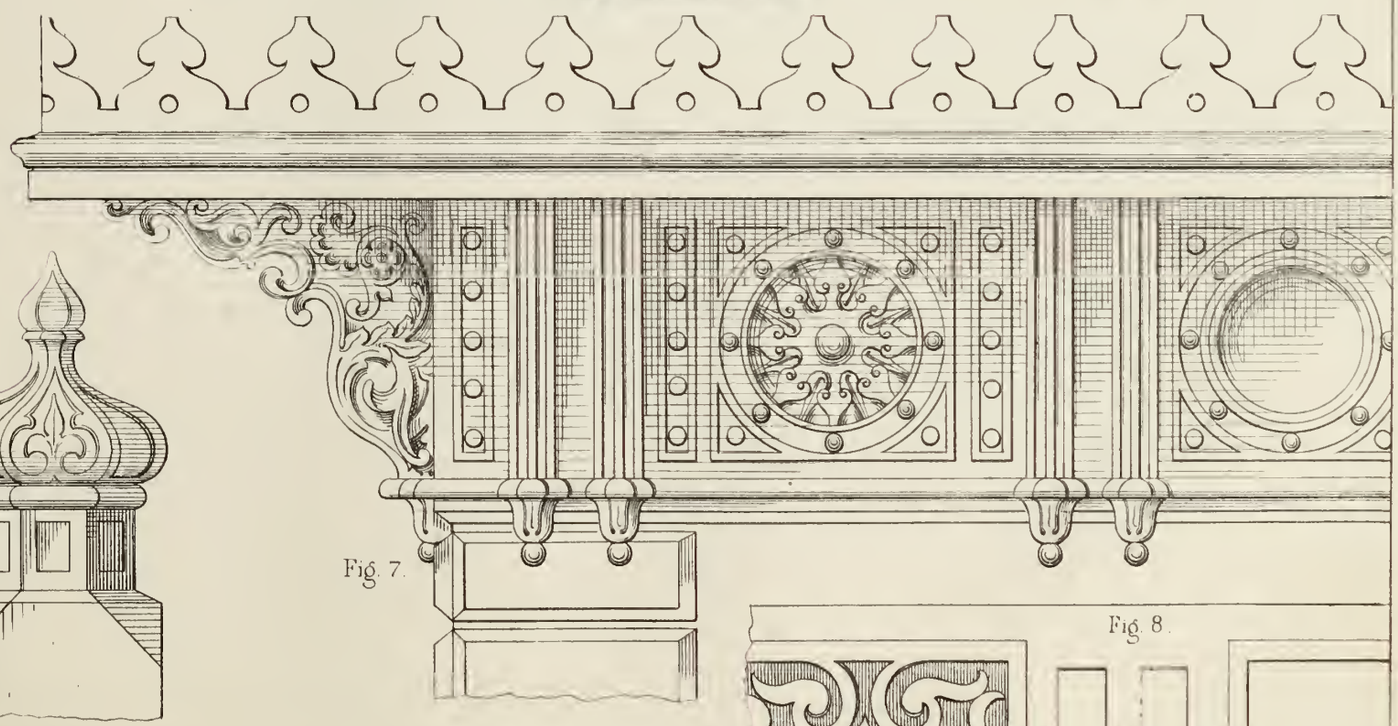
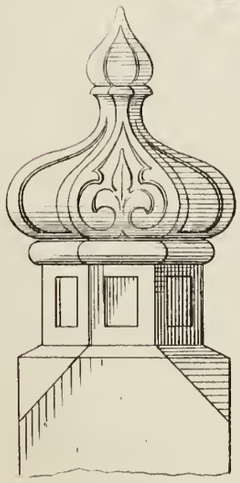


Fig. 7.



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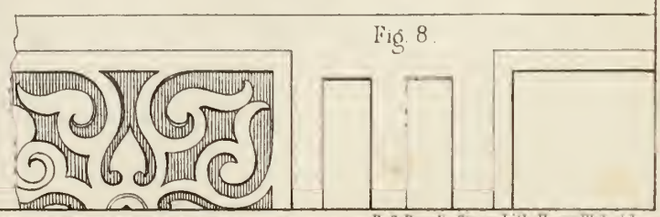


Fig. 8.

Scale: ½ inch to the foot.

Sam[l] Sloan, Arch[t]

P. S. Duval's Steam Lith. Press Philad[a]

DETAILS.

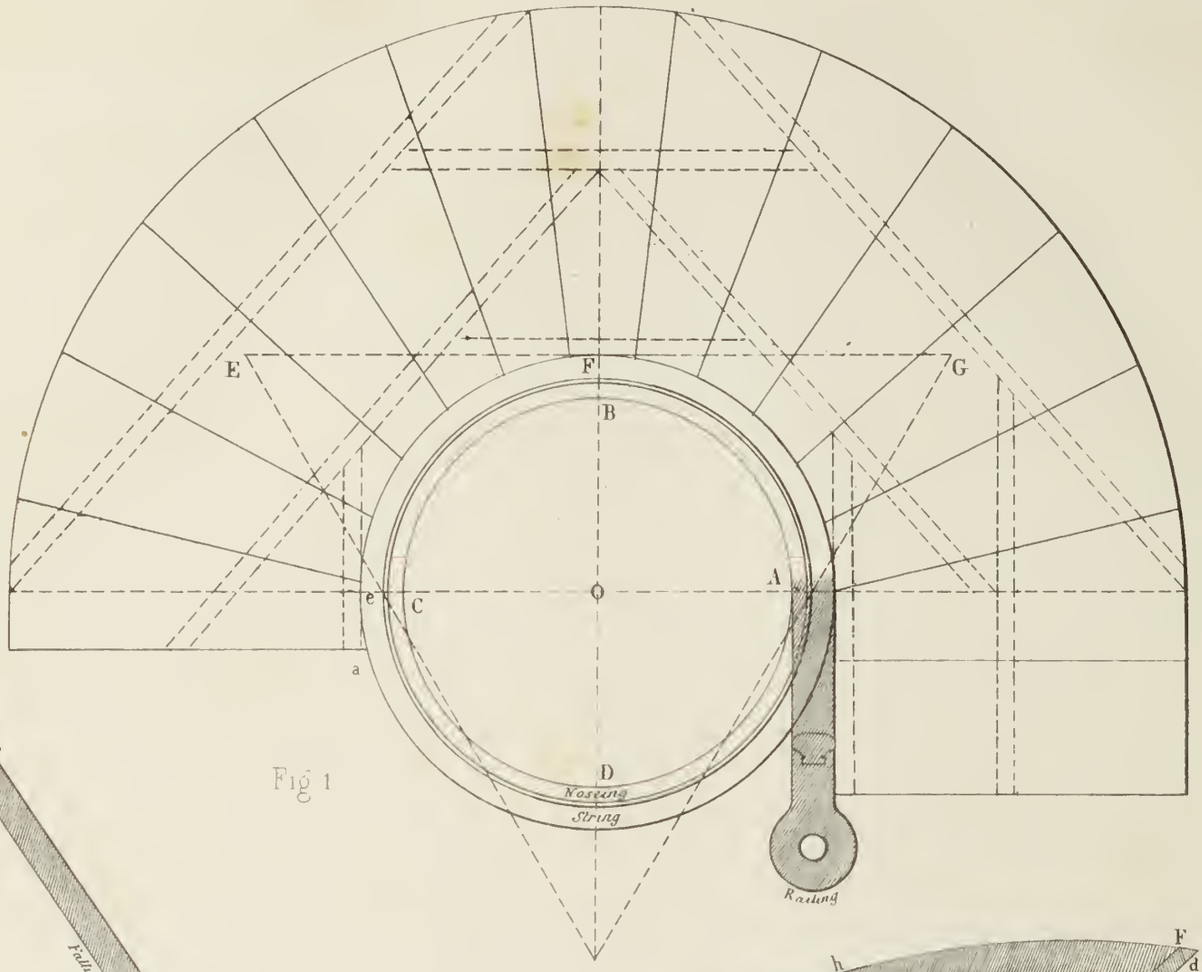


Fig 1

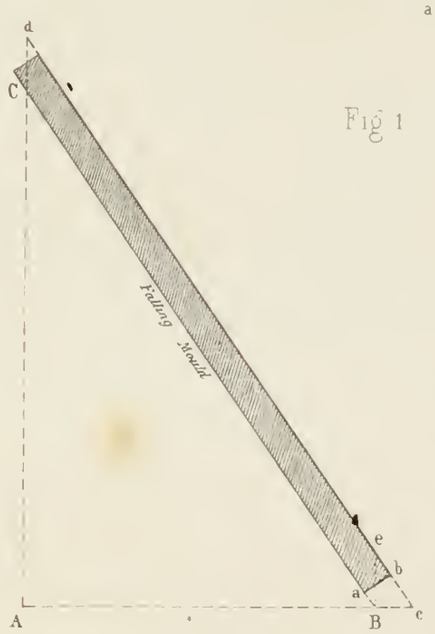


Fig 2.

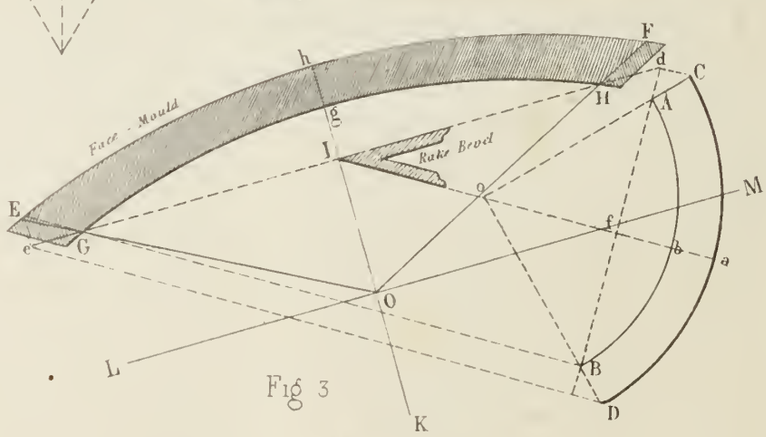


Fig 3

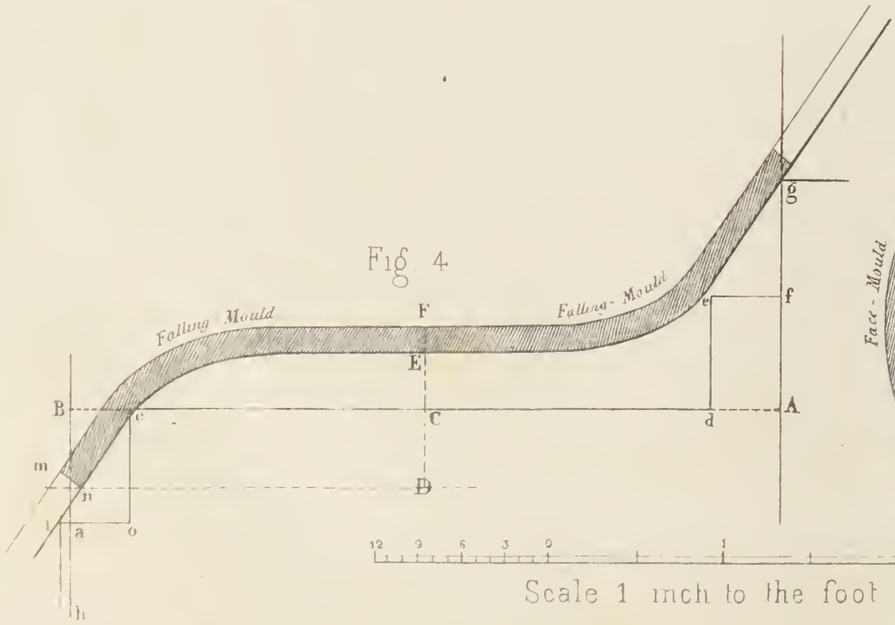


Fig 4

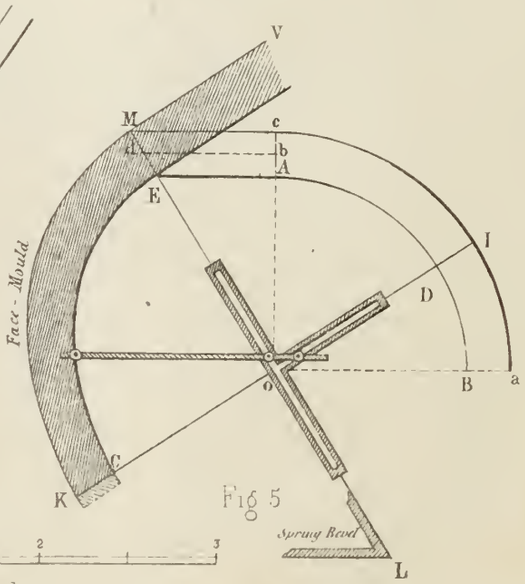


Fig 5

12 9 6 3 0 1 2 3

Scale 1 inch to the foot

P.S. Duvals Steam lith press Ph

DIAGRAMS FOR STAIRS.

and the position of the gas flues and warm air flues are exhibited. There are also rooms in the attic lighted by round windows which may be seen beneath the cornice on the front elevation.

Plate LXXV. consists of details. Fig. 1 is the outside dressings of the front windows of the wings. Fig. 2, the porch front. Fig. 3, section of the pillar. Fig. 4, side view of the wing balcony.

Plate LXXVI. is also of details. Fig. 1, minaret on the corner. Fig. 2, cornice, brackets and windows of the tower. Fig. 3, section of the same. Fig. 4, cupola of the tower. Fig. 5, section of the same. Fig. 6, minaret of the front porch. Fig. 7, main cornice, brackets, &c. Fig. 8, paneling. More minute description of this building is unnecessary.

CIRCULAR STAIRS.

Upon the plate facing this page will be found diagrams for planning a geometrical stairway, and for obtaining the moulds by which to cut out the hand-rail. They were furnished for our work by John S. Basehore, Esq., stair-builder of this city, and undoubtedly comprise the simplest and most complete method now in use, being far superior, as practice has shown, to the old cord-line method. They are called trammel drawings, because that instrument is used to draw the sections of ellipses. The following concise explanation of the diagrams may be useful to aid in comprehending them.

In preparing to build a stairway we must first draw a vertical projection, as in Fig. 1. This is quite a small stairway, but sufficient for our purpose. The framing of the carriages is shown by the dotted lines.

To obtain the falling mould for that part of the hand-rail which lies between A and B, Fig. 1, or B and C, we take the distance AB on the inner side of the string, by the stretch-out, and have AB=FG. Now in Fig. 2, we draw AB equal to FG, Fig. 1, and on the perpendicular (Fig. 2) we take AC equal to the sum of the heights of the risers between the points A and B, Fig. 1. Join B and C, Fig. 2, and take a b equal to the thickness of the rail, and draw c b d. Erect the perpendicular B e and draw a b so that its centre will lie in B c. Also let the centre of the other butt lie in C d.

The face mould for the same part of the rail is obtained as follows. Draw the quadrant o A b B, Fig. 3, with a radius equal to OA, Fig. 1, and take AC equal to the width of the rail, and draw CaD. Draw AB and erect the perpendiculars D e, BG, a o and C d. Take BG equal to AC, Fig. 2, and through G and d draw e d. At the point I where a o meets e d erect IK perpendicular to e d. Take IO equal to o f, and draw LM perpendicular to IK. These lines, IK and LM, are the trammel lines. Take Ig equal to f b, and g h equal to b a. Fix the trammel on the lines IK and LM, and then describe GgH. Draw cE perpendicular to e d, and also draw OE and OF. Again with the trammel describe EhF. This gives us EFGH, the face mould. This is laid upon a plank as thick as the width of the rail, and marked. Then the rake bevel shown in the figure is applied at the point G to get the corresponding point on the other side, when the mould is again set and marked. After this is cut from the plank the falling mould is applied to the edge, and the piece again marked and cut, thus giving the exact shape of the rail. The overwood, from which the butt is cut, is also shewn.

To obtain the falling mould for that portion of the rail which lies between C and D, Fig. 1, and that between D and A in ascending a second flight beginning over the second step of this, take the whole stretch-out, EG, Fig. 1, and lay it down from A to B, Fig. 4. Let fall the perpendicular Bh, and take cB equal to a e in Fig. 1. Now draw the steps e o i and d e f g, and extend Ag. Through the point C in the middle of the line AB, draw the perpendicular FD, and take EC equal to $\frac{1}{2}$ e d. Draw now gEi. Take EF equal to the thickness of the rail, and through F draw a line parallel to gEi. The centres of the extreme butts will lie in Bh and Ag respectively. Draw Dn parallel to AB through the point n.

It now only remains to obtain the corresponding face mould. Draw the quadrant oADB, Fig. 5, similar to oAbB in Fig. 3. Make Ae equal the width of the rail, and draw eIa. From the point b midway between e and A, draw b d equal to DE on Fig. 4, and parallel to o a. Through d and o draw the trammel line ML, and perpendicular to this through o draw the other, IK. Let oK=oI, and oC=oD. Draw also Me and AE parallel to d b. Now place the trammel as exhibited on the lines, and draw EC and KM. Then is KMEC the face mould. The strip beyond ME must remain attached to the mould. The edge MV is ranged with the edge of the plank, and the mould marked. This edge must then be beveled with the spring bevel whose lower side is parallel to o a. The edge MV is placed against the beveled edge on the other side, the mould marked and the piece cut out.

THE MORTAR.

IT will doubtless be a matter of surprise to some that this subject should receive an extended notice, although really it is of the highest importance. Unfortunately, however, it is one of the points in which little or no care is exercised, and the master mason usually builds with mortar prepared either by a careless apprentice or an ignorant laborer. He never thinks of the permanence of his work, unless it be surrounded by extraordinary destructive agents, but if the finished structure stands, he and his employer are satisfied. But in the present day, when our walls are built so thin and lofty and are often veneered upon the outside with slabs of marble or granite, a mortar should be used that will bind the mass together, and make the whole as one stone, otherwise premature decay will continue to crumble our dwellings, and our cities and villages, as indeed is now the case, will require rebuilding every few years. It is time that all interested should be aroused to attend to this matter, more neglected perhaps than any of the many neglected processes connected with erection of ordinary buildings. There have been a few treatises on mortars published by those whose position has interested and enabled them to experiment extensively, but the little light admitted by these researches seems to show that we are almost void of any knowledge of the subject. What we shall say is mainly derived from such sources, and combined with a little practical knowledge acquired by observation, may serve to awaken inquiry in the minds of some who have as yet treated longer and more complete essays with indifference.

Mortar may be described in a general way as a compound of various substances capable of entering into a chemical combination that indurates the mass, attaching it at the same time to the building materials, and thus binding them firmly and lastingly together. One of these ingredients is sand, of which little need be said, but that little is important. It consists essentially of silica or quartz, the purer the better except in the case of arénes, the foreign matter in which is of a nature to increase its value. Sea-sand, when none other is accessible, must be thoroughly washed in order to free it from the salt with which it is impregnated, and indeed in all cases the sand should be washed and sifted. River-sand when well selected will answer every purpose, but pit-sand, when economically obtained, is preferable. The former is generally cleanest, but the grains composing it are apt to be rounded in their passage down the stream, and it consequently contains fine powder, the result of the abrasion, which must be avoided. The grains of pit-sand never having been subjected to such action are sharp and angular, and therefore, as will hereafter appear, are much better fitted in this respect for the purposes of the builder.

The other essential and most important ingredient of mortar is lime. The limestone yielding it is found native, and contains in addition a certain amount of carbonic acid chemically combined, thus forming a carbonate of lime. Before the lime is fit for use this acid must be expelled by calcination in kilns, which is always accompanied by a loss of weight to the amount of about forty-five per cent., which includes also the water. A high degree of heat is requisite to disengage the carbonic acid, and the whole process is one requiring experience and care. The smaller the pieces of limestone are the less is the time required, the disengagement of the acid being greatly aided also by having them moist when placed in the kiln, but still a good red heat must be maintained for several hours, varying in number according to circumstances. This heat too must gradually be augmented, since the last remaining portions of the acid are most difficult of expulsion. It requires no small amount of skill to know how much heat to apply, and when to stop the process. Some of the best limestones if over heated are rendered useless or "killed," and often the calcination must be stopped before all the acid is expelled. With the rich limestones an almost inexplicable case obtains. If a certain portion of the acid be retained the lime is excellent; if the burning cease at the point when all the acid is expelled the lime is almost useless, and if it be continued for a certain time beyond this point the lime is again excellent, except that it is apt to swell in setting. Unfortunately, so little is certainly known that we cannot yet give definite directions on the calcination of limestones, although it is as important as any other point connected with our general subject; but as Mr. Burnell, who is perhaps the most recent and best authority, says :—"At present our best guide is experience, and a kilnsman who has watched the action of his own kiln for years knows more upon the subject than the first theoretician in the world."

The lime thus obtained is by no means chemically pure, but always contains a variable quantity of clay, which consists of alumina and silex together with certain other substances in such small quantities however, that they may be disregarded. But the result is materially affected by the proportion of alumina and silex which may exist in the lime. The varieties thus produced will be spoken of as lime, hydraulic lime and cement. Villeneuve thus classifies them and says :—"The calcination of the carbonate of lime containing from one to six per cent. of clay produces ordinary lime ; if the quantity of the clay be greater (equal to from six to twenty-three per cent.) the lime is suitable to be made into hydraulic mortar. Beyond twenty-three to twenty-seven per cent. of clay the result of the calcination of the calcareous compound is termed cement. Practical experience has shown that between lime suitable for hydraulic purposes, and cements a line of demarcation exists in the form of the lime containing about twenty-three to twenty-eight per cent. of clay. This combination neither slacks into powder when wetted with water, nor does it cohere permanently when mixed with water and beaten together." But this can only be regarded as a general statement which may fail in practice, and hence the selection of a limestone should rest mainly on experiment. Vicat, whose extensive and valuable researches gave the first impulse to enquiry on the subject, says :—"The physical characters which serve to distinguish calcareous compounds fail to give any certain

indication of the qualities of the lime they contain. Even chemical analysis is but an approximate mode of investigating them. Experience by actual trial ought to be the builder's only guide." We may remark in passing that the limestones of the United States are very generally characterized by containing a large amount of magnesia which seems to unfit most of them for building purposes.

Before the mortar is compounded the lime must be slacked. It is a well known property of caustic lime to combine powerfully with water, forming what is technically termed the hydrate of lime, or in common parlance, slacked lime. This action is accompanied by the evolution of considerable heat, and the lumps decrepitate into powder to a greater or less extent, after which the whole will be found to have increased in weight according to the quantity of water combined. The rich limes should always be slacked by gradually adding water and allowing them to remain wet, for these limes will retain their plastic state beneath the water, until the effect is thoroughly accomplished. We are told the Romans had a law that the lime should not be used until it had laid in a moist state for three years. This it was supposed would give ample time for the most minute particles to become hydrated.

The case however is different with the hydraulic limes, and the better their quality the more imperfect will be the comminution of the lumps. It is therefore essential, we may say, that they should be brought to a state of fine division before slacking, either by pounding them, or much better, when the magnitude of the work justifies the expense, by grinding them in a mill. Another reason why this should be done is that very soon after slacking the hydraulic lime begins to set, and hence everything which facilitates the rapidity of mixture and use adds to its value. After being ground it should be slacked by sprinkling with water and working the paste until the slacking be thorough and complete, which is important, since limes swell in slacking and will therefore disintegrate the mortar if not fully hydrated.

We have remarked that the limes containing from six to twenty-three per cent. of clay are suitable for hydraulic mortars. The great superiority of these has led to their artificial production by mixing various foreign substances with the rich limes. It was ascertained that the Roman artizans in preparing their mortar, which at this day is more firm than the building stones, mixed with their lime a volcanic substance called puozzolano. Subsequently the same material was discovered in Germany, where it is called trass, in France and in Scotland, and has been used with wonderful success. It consists chiefly of alumina and silex, mixed with a small proportion of lime and highly magnetic oxide of iron. When introduced into the mortar it communicates the property of setting with great rapidity even under water, and of retaining a firmness and cohesive power for ages, after the manner of natural hydraulic mortar.

Some clays after a moderate calcination are found to possess the same properties to a very considerable extent when not subjected to the action of sea water. Their composition is nearly the same as that of the puozzolanos, but the components are hydrated and this water must be driven off by the calcination. Mr. Burnell thinks that the lime and clay should be calcined together so that a more intimate mixture may be secured, thereby favoring chemical action. Experiment at present is the only way to test the goodness

of the clay and the degree of calcination. The Romans often used pounded bricks or tiles, and the slag and scoriæ from iron furnaces are also excellent ingredients. They must previously be reduced to a powder, and only those are fit for the purpose which will dissolve or become gelatinous under the action of muriatic acid. Ashes of various kinds have also been successfully tried, but before mixture they must be freed from the alkalies by washing.

Experience has shown that the best plan in preparing mortar is first to bring the lime to the consistence of a smooth and uniform paste before adding the components. The sand must be gradually intermixed and the whole thoroughly worked together. This is a point usually but little attended to, but nevertheless is of great importance. The more the mortar is worked the more sand will it take, and the greater will be its durability. The old Romans, Vitruvius says, had a proverb that mortar should be moistened with the sweat of the brow. It may be proper to observe that in the case of hydraulic mortar this working must be done with many hands since it is requisite that it should be placed in position as soon as possible. As to the proportionate quantity of the sand to the lime, again we cannot be definite, so much does it depend on the various qualities of the latter; we may state, however, that the rich limes require a larger quantity than the hydraulic. Vicat thinks it better to err in a deficiency than an excess of lime in mortar made from the rich limes, and vice versa with that from hydraulic limes. According to Vitruvius, the Romans prescribed three parts of coarse sand to one of lime; and according to Pliny, four of the former to one of the latter. In compounding the artificially hydraulic limes, such proportions must be used as experiment shows to be best. Except where both are calcined together the clay, burnt and powdered, must be mixed with the lime after slacking and before the sand is introduced.

The setting frequently alluded to is an imperfect crystallization by which the whole becomes converted into an indurated crystalline mass. The result is greatly aided by the sharp angles of the sand grains which afford nuclei for this crystallization, and are points of attachment by which the whole is firmly bound together. On this principle, also, the mortar adheres to the stone or brick of which the wall is constructed. In the ordinary mortars, those composed of rich lime and sand, the crystalline portion is carbonate of lime, and hence if all the carbonic acid be expelled in the calcination it must be reabsorbed from the air before the setting can take place. This is a slow process. The mortar may become somewhat dry in the course of a few days and possess a slight cohesive power, but it may require years in order to become thoroughly indurated. There have been cases where walls a hundred and fifty years old were found to contain on the interior mortar as soft and fresh as the day it was laid. This justifies the French proverb that mortar of a hundred years is still young, and shows the importance of using, where it is possible, those mortars that do not depend on the absorption of carbonic acid for induration.

Such is the case with hydraulic mortars both artificial and natural. They set in a few hours after being prepared; hence we must believe, and indeed subsequent analysis shows that the crystalline substance is

not carbonate of lime, but some other chemical compound of the several ingredients. Upon the nature of this, however, chemists are not as yet fully prepared to pronounce.

The hydraulic mortars have engaged most of our attention, because of them little is practically known, and they certainly are of the first importance. The name hydraulic is given them because of their property of setting under water, and heretofore they have been used almost exclusively for marine and other hydraulic works. It is highly important, however, that we should possess and put into practice the means of giving greater durability and security to our ordinary buildings, and there is no reason why the hydraulic mortars should not be used to this end. They act equally well, if not better, in air, and with skill can doubtless be made so economically that the difference in expense is no ground of preference for ordinary mortars. It is only necessary that the experiment be made a few times. Success is certain, and will be the greatest, the most valuable advance in modern construction. Of cements little has been said, since they are rather disconnected with the peculiar views which we wished to inculcate. It is nevertheless gratifying to know that their composition and properties are being thoroughly examined, and the recent experiments at the World's Exhibition show that little is left to be desired in the accomplishment of the purposes to which they are particularly adapted.

A VILLAGE CHURCH.

DESIGN NINETEENTH.

This is the first design for a church introduced into our work. It is after the Romanesque style, but nevertheless retains the general outline and plan usual in this country as being the best adapted to our present form of worship. We have given it a most compact arrangement, but at the same time have been quite free in exterior ornament. There is a medium to be observed here. We view with natural displeasure any parsimony that may exhibit itself in the house of God, and at the same time dislike great attention to physical comfort, or lavish expenditure in decoration as shewing too much regard merely to the place of worship. The building should possess dignity, nobleness, grace, and be free from every trace of gaudiness. The interior should be comfortable but not luxurious, and should be fitted entirely to the form of worship. Any one may see that to meet all these requisitions is no easy matter.

The apartments of the present design as was remarked, have been compactly but we hope conveniently arranged. Reference to the floor plans, Plate LXXIX. will explain this arrangement. The lecture room is placed in the basement. Around three sides of the building an area extends as deep as this floor, by which we avoid any great elevation of the body of the building. A gallery is placed in the church on small iron pillars, and is attained by means of two stairways. From it we ascend the tower. These stairways are on either side of the tower, the base of which constitutes the principal vestibule or lobby.

Sam[l] Sloan Arch[t]

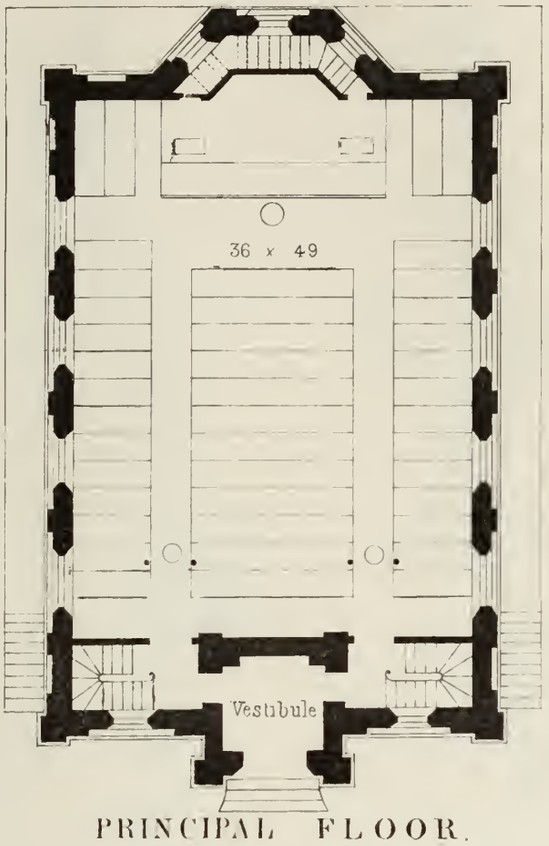
P.S. Duval's Steam lith. Press. Philad[a]

FRONT ELEVATION.

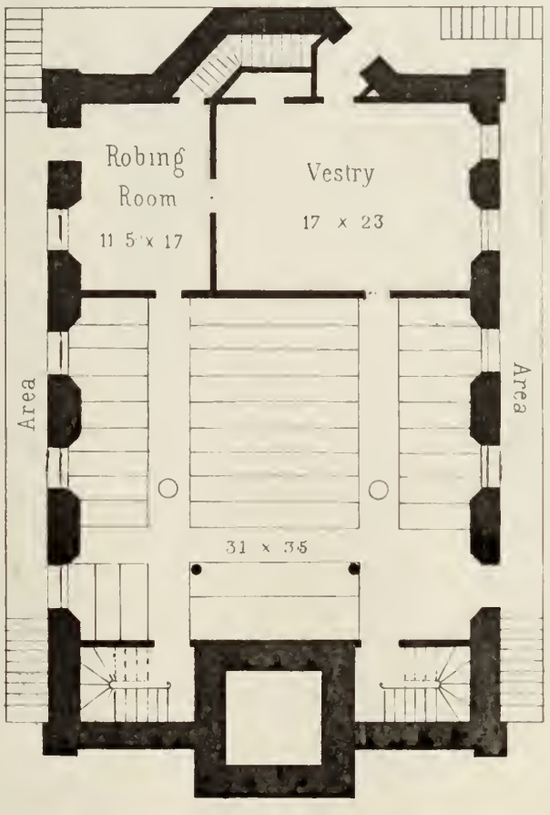
Sam[l] Sloan Arch

P.S. Duval's Steam lith. Press. Philad[a]

A VILLAGE CHURCH.



PRINCIPAL FLOOR.



BASEMENT.

Scale 16 Feet to the inch

GROUND PLANS.

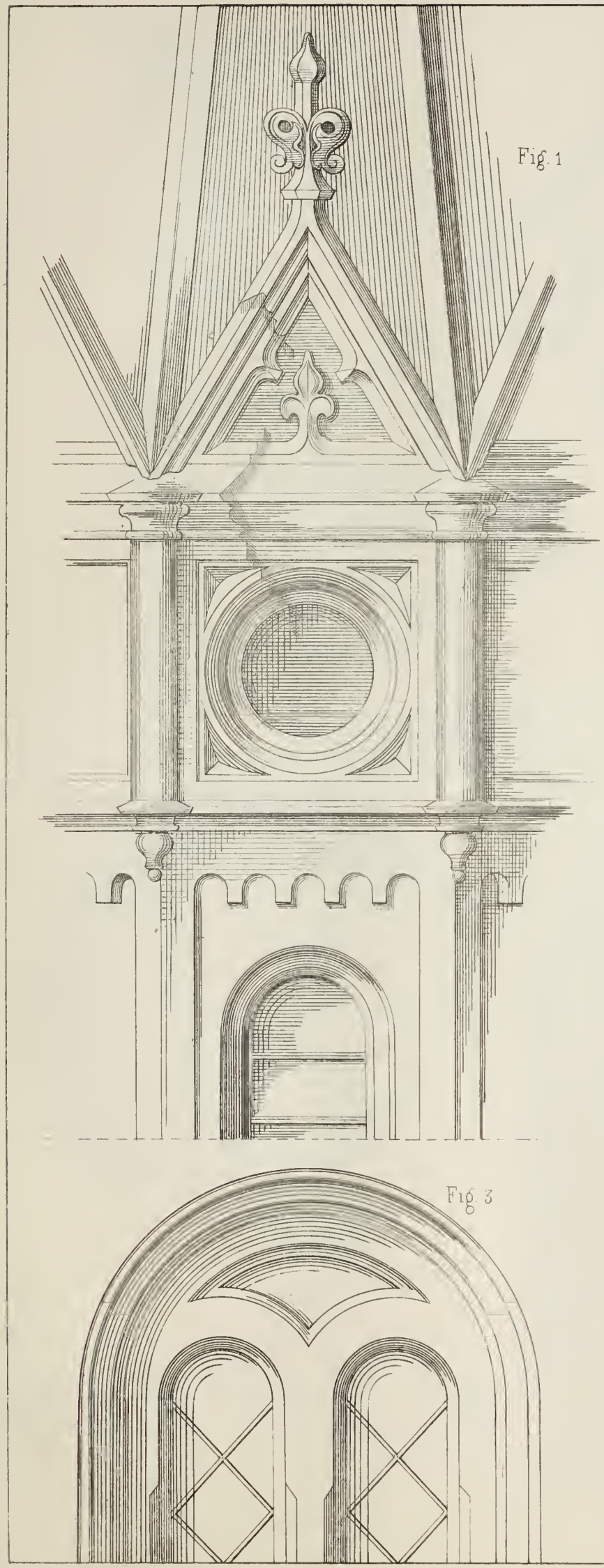


Fig. 1

Fig 2.

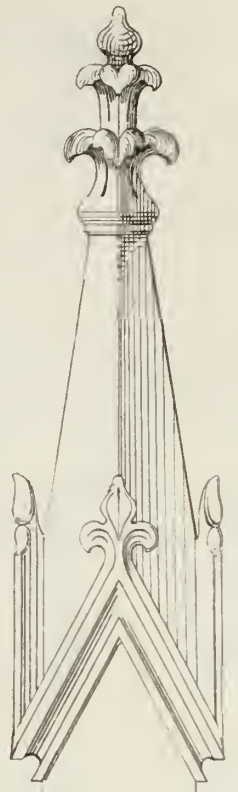


Fig 6

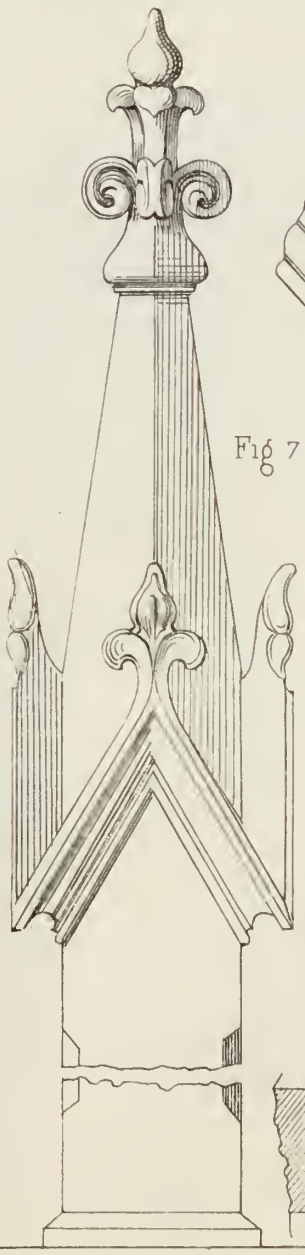


Fig 7

Fig 5

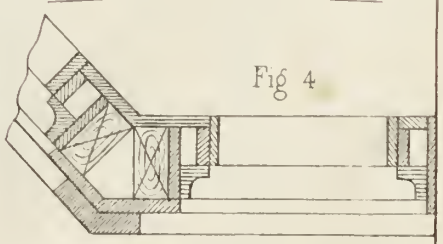


Fig 4

Fig. 3

Scale ½ inch to the foot.

P.S. Duval & Steam Lith. Press, Phila.

DETAILS.

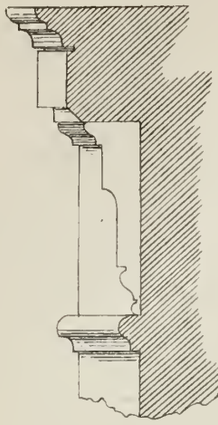


Fig 2

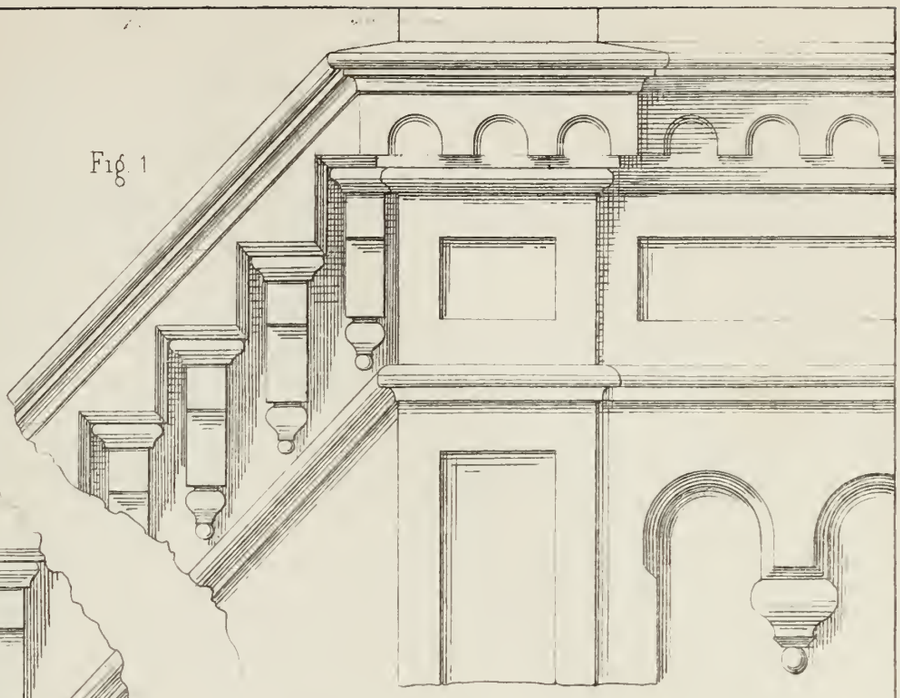
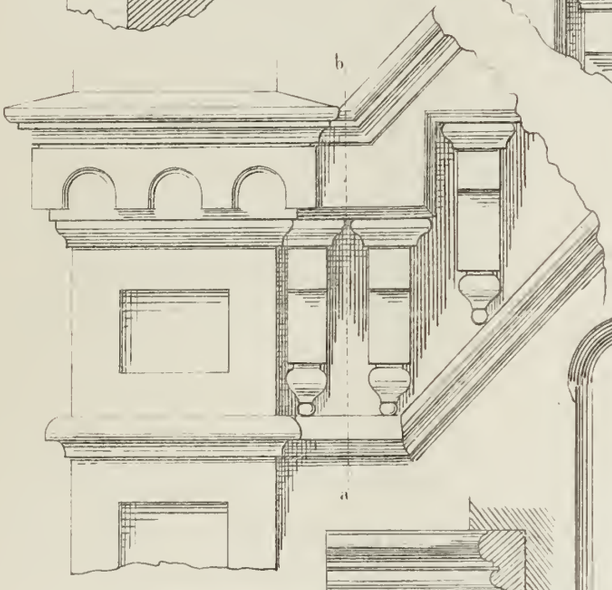


Fig 1



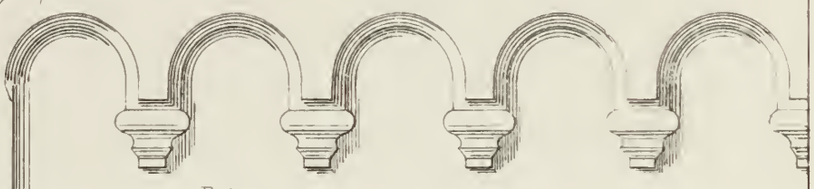


Fig 3

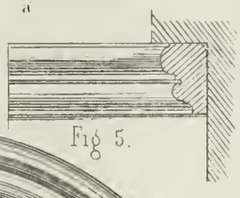


Fig 5.

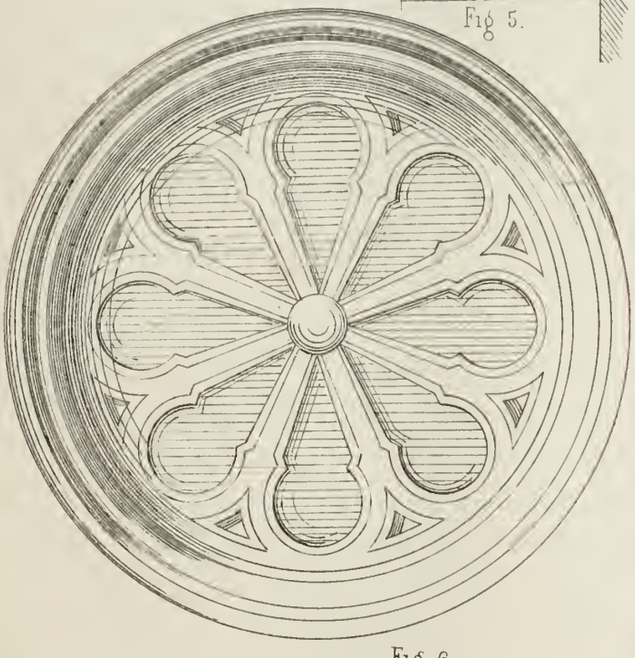
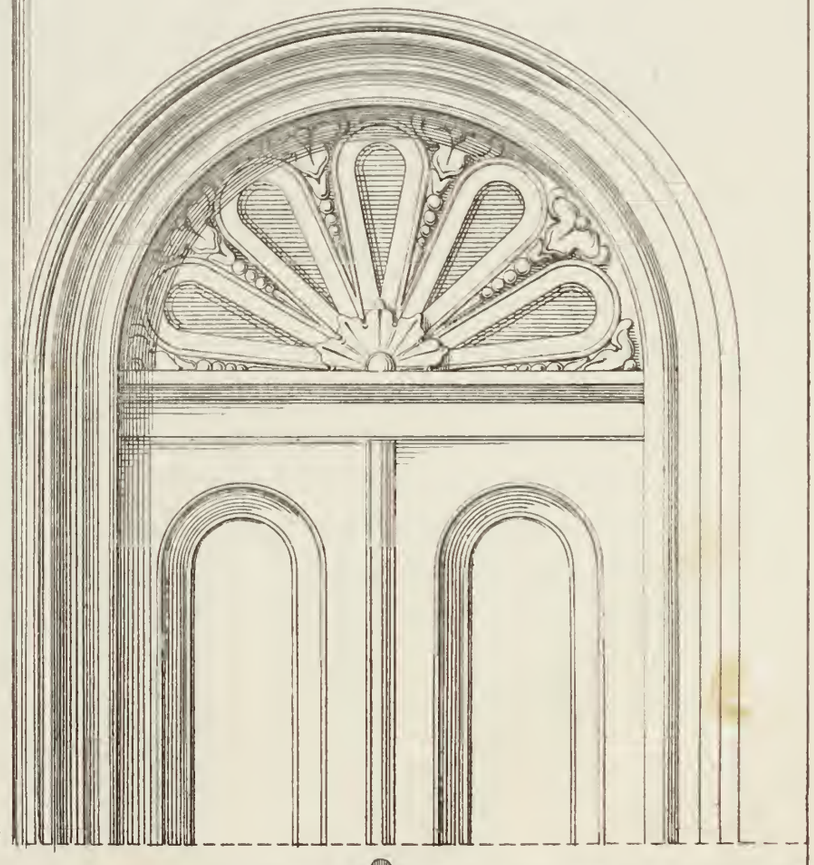


Fig 6.



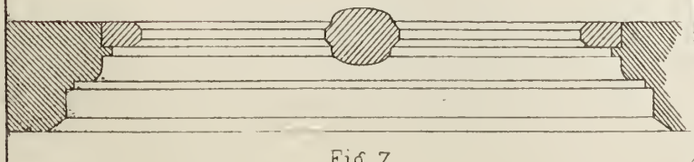


Fig 7.

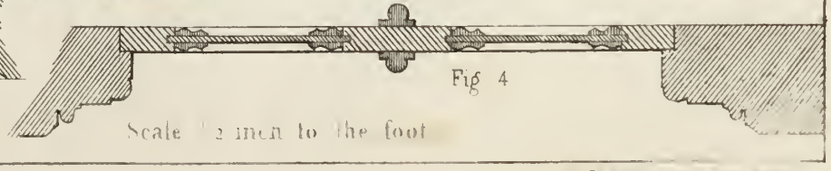


Fig 4

Scale [illegible] inch to the foot

DETAILS.

Plate LXXX. consists of details. Fig. 1, elevation of a side of the tower. Fig. 2, finial of the tower. Fig. 3, window of the tower. Fig. 4, section of the octagonal part of the tower. Fig. 5, section of Fig. 3. Fig. 6, finial of the tower buttress. Fig. 7, finial of the corner.

Plate LXXXI. is also of details. Fig. 1, the cornice and corbel course of the front. Fig. 2, section through the line a b. Fig. 3, front door. Fig. 4, section of the front door. Fig. 5, moulding of the triangular panels. Fig. 6, round window of the tower. Fig. 7, section of the window.

The building is forty-three feet front by sixty feet deep; it has a recess on the rear four feet deep, and the tower projects forward four feet. From the basement floor to the main floor, which is three feet above the natural surface, is ten feet, and from thence to the ceiling twenty-two feet. The walls are of brick, on a stone foundation as high as the basement floor, and are two feet thick to the second floor,.and from thence eighteen inches to the square of the building. The panels on the outside walls are three inches deep, and those on the buttresses are two inches. The walls of the tower are two feet six inches to the first floor, and from thence two feet thick to the square. The octagonal portion is entirely constructed of wood, and crowned with a spire and finial. It is proposed to enclose the spire with the best purple slate, in an ornamental pattern. All the exterior walls are to be rough-cast, and afterwards coated with Silver's plastic paint. The basement contains a lecture room, a vestry or school room and a robing room, which last has stairs in the recess leading to the pulpit. The lecture room also has stairs leading beneath the gallery stairs to the principal floor. The dimensions of these rooms and of the body of the church are marked upon the plans. The seats on the principal floor including the gallery would comfortably accommodate three hundred persons.

For warming this building we would recommend a Chilson furnace, No. 6, which is the most effectual and durable that has come under our notice. This furnace should be located under the basement floor near the tower, and will require an excavation of about seven feet in the clear. The furnace chamber should be about eight feet square, and constructed of two four inch walls with a four inch space between. The cold air must be introduced through an underground duct, in size about twelve by thirty-six inches in the clear. The sides and bottom may be of brick and the covering of flag stones. This duct must communicate with the external atmosphere at the nearest accessible point, and be protected at the opening with an iron grating. Of the four warm air flues which emanate from the crown of the chamber, one will lead to the intersection of the division walls in the basement, so that it may communicate with the robing room, vestry, lecture room, or the main room above. Of the others one will communicate with the lecture room, and the other two with the room above. By this arrangement any apartment may be completely warmed.

To thoroughly ventilate this building ventiducts should be placed in the wall on each side of the pulpit. Likewise in the second and third piers. Each of these ducts should be at least nine by sixteen inches in the clear, made air-tight, and smooth on the inside. Each must extend from the floor to the apex of the roof, at which point they are connected into one, equal in capacity to all the others, extending a few inches above the roof, and neatly capped with one of Emerson's twenty-four inch ejecting ventilators. The ducts referred to must have valves at the floor and ceiling which can be opened and closed as the temperature of the room may require.

The cost of the design here presented, with such specifications and details as we would provide, finished in the best manner within and without, would be about four thousand eight hundred dollars.

ITALIAN VILLA.

DESIGN TWENTIETH.

PLATE LXXXII. presents the front elevation of an Italian Villa, the perspective of which is exhibited on the plate below. There is nothing peculiar in this design to call forth extended remark. Its prominent features are bold, and the details are plain and simple. The situation best suited to its character is as represented in the midst of a park, with a fine command of prospect and surrounded by a variety of shrubbery and trees. It may be placed in a very secluded position and yet harmonize strictly with objects around. Still we must remember that the character of the style is not rural, but requires surrounding evidences of art and taste to give it consistency.

Plate LXXXIV. exhibits the various floor plans. The one beneath is of the basement story which contains, as may be seen, both dining room and kitchen. This arrangement possesses many superior conveniences, but is much more extensively used in England than in this country. The furnace by which the whole building is warmed is placed in the middle of the basement and within a double brick case. It is in a position where it cannot incommode, and in an apartment that could be used for nothing else, since it cannot be lighted.

On the first floor to which we ascend by the stairs beneath the hall stairs, there are five apartments. The dotted lines in the porch shew the general outline of a pattern of flooring tiles. Indeed it would be well to floor the hall with either tiles or marble, it being the most permanent as well as the most beautiful style in use. The windows of the parlor, drawing room, and library opening into the verandahs are designed to reach the floor.

The second story contains six chambers, and will readily accommodate a family of eight including the servants. Above the central stairway is placed a sky-light to light the upper hall. The narrow stairway leads to the apartment in the tower. The roofs above the verandahs might well be arranged as balconies, in which case there might be additional windows in the central back chamber leading out on them.

Plate LXXXV. exhibits the details. Fig. 1, is the chimney-top. Fig. 2, side view of the same. Fig. 3, section of the gable shewing the cornice and bracket. Fig. 4, cornice of the eaves. Fig. 5, cornice of the tower. Fig. 6, railing of the entrance. Fig. 7, section of the same. Fig. 8, Finial of the tower. Fig. 9, side butment of the same.

The basement story of this design is ten feet high in the clear. The first story is twelve feet eight inches from floor to floor, and the second story is eleven feet in the clear. The walls of the basement as high as the first tier of joists are of stone, and eighteen inches thick. All other walls are of brick, and sixteen inches thick. The two principal division walls are also of brick, but all others are stud partitions. The main roof and that of the verandahs and tower are all to be of tin ribbed in the manner represented on the front elevation and details. The front porch is to be entirely open with a groined vault above, and the front door also is to have an arched head. The whole of the outside wall is to rough-cast in the best manner, and all outside wood-work except the door and window frames is to be painted in the same tint as the rough-casting, and sanded. All the windows throughout are to have inside shutters. In all other respects the building is to be finished in the same way as similar buildings heretofore described.

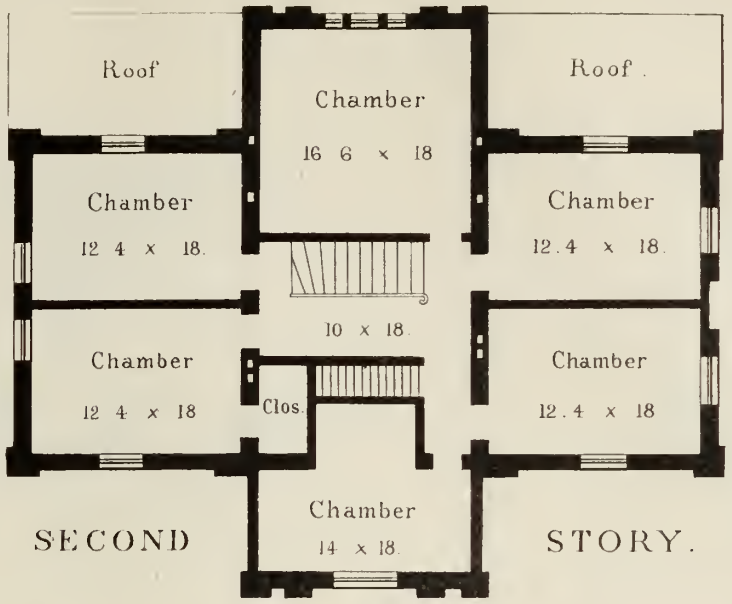
Sam[l] Sloan Arch[t] P.S. Duval's Steam lith. Press Philad[a]

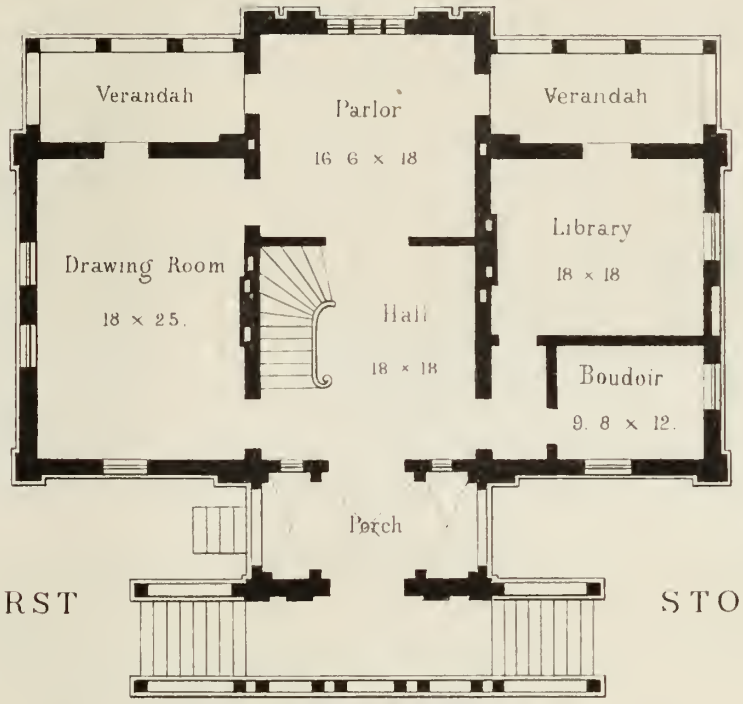
FRONT ELEVATION.

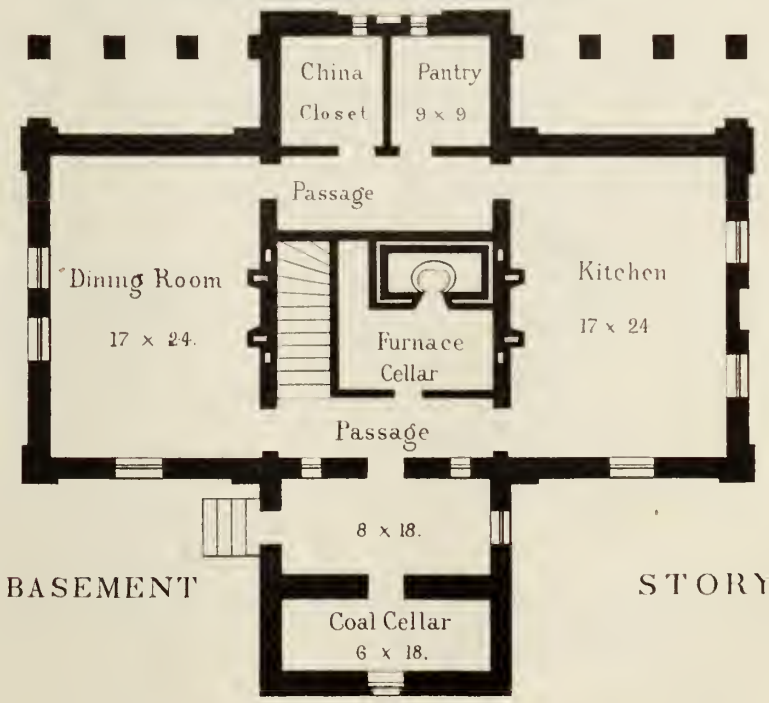
Design XV. *Pl LXXXIII*

Sam[l] Sloan Arch[t] P.S. Duval's Steam lith. Press Philad[a]

ITALIAN VILLA.







Scale 16 feet to the inch.

10 8 6 4 2 0 10 20 30 40 50

Saml Sloan Archt

P S Duval's Steam Lith Press Philad.a

GROUND PLANS.

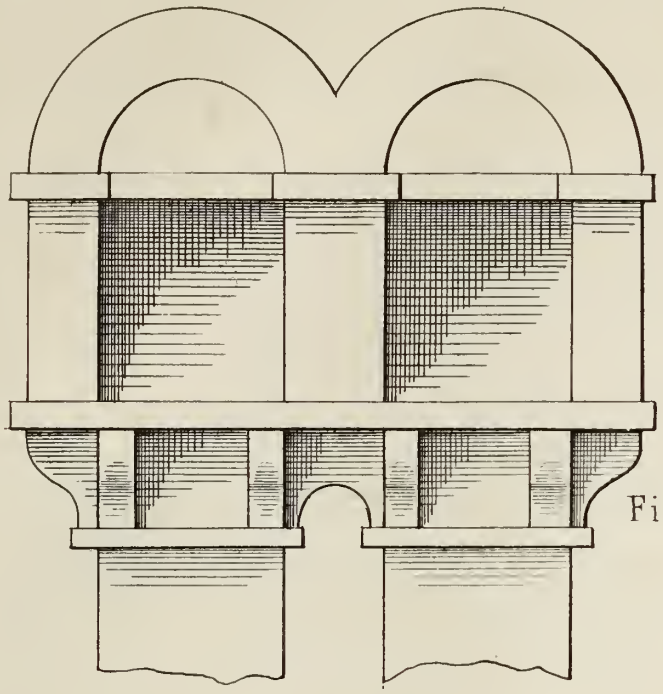


Fig.1.

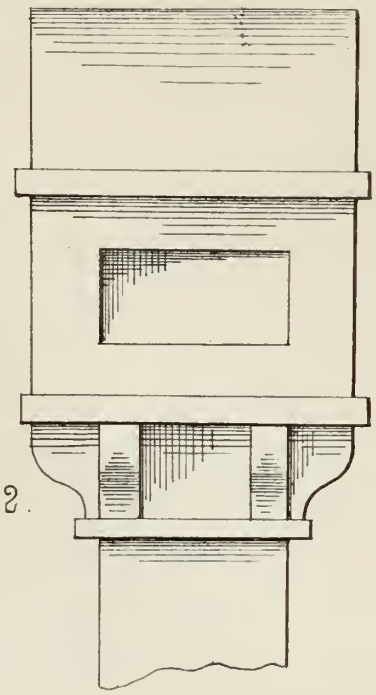


Fig.2.

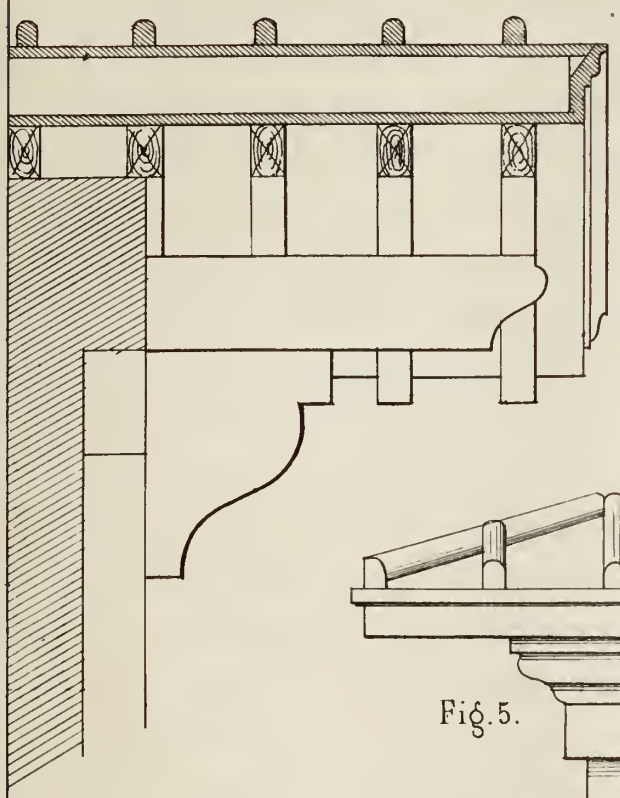


Fig.3

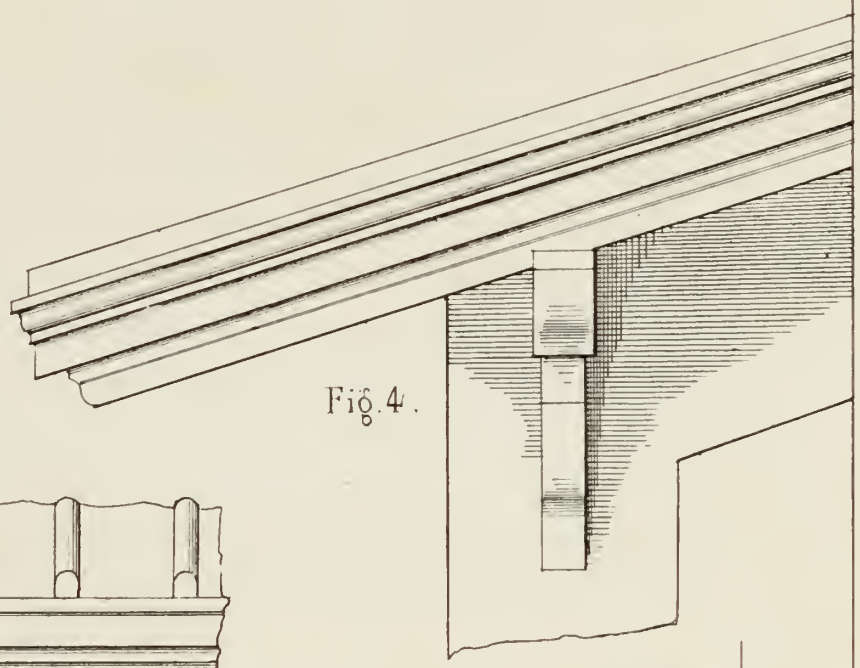


Fig.4.

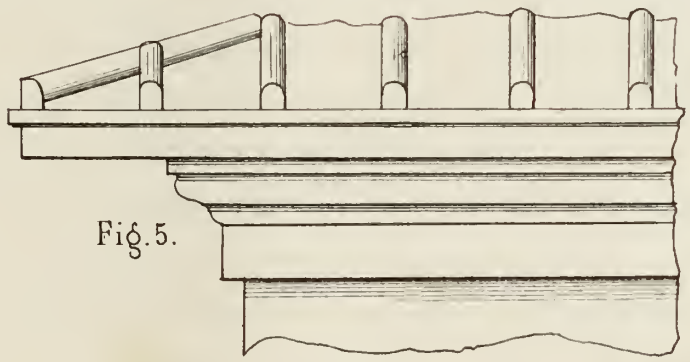


Fig.5.

Fig.6.

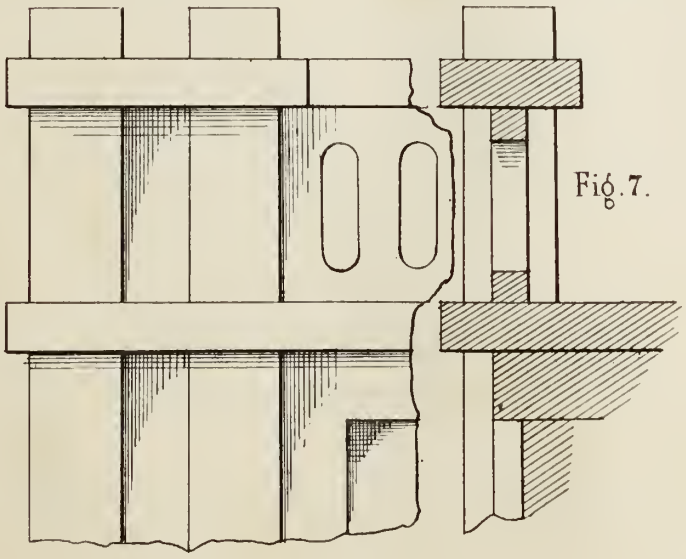


Fig.7.

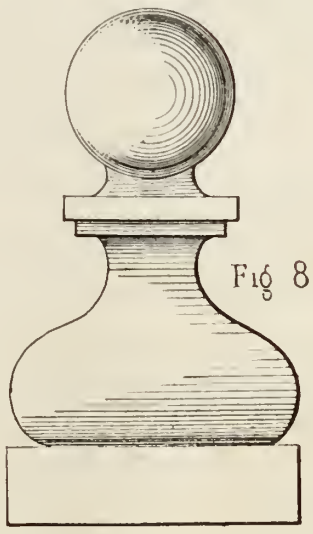


Fig 8.

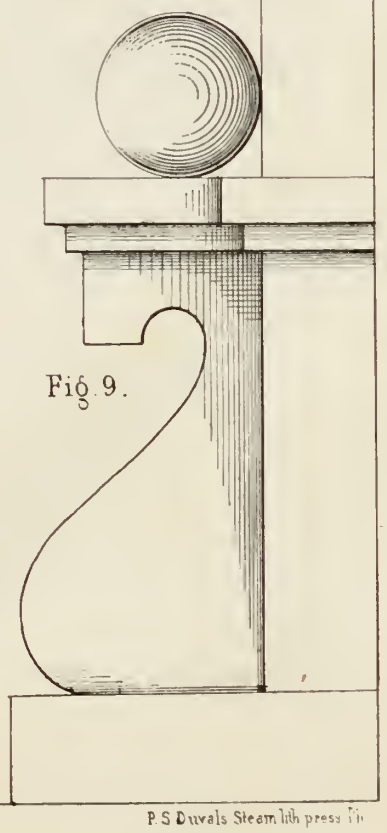


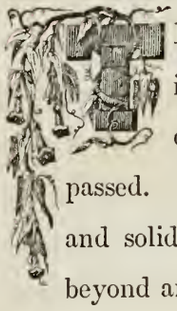
Fig.9.

Scale ½ inch to the foot.

S[t] Sloan Arch. P.S Duvals Steam lith press Ph

DETAILS.

MASONRY.



HE next point to which our attention must be directed, in reviewing the process of building, is the wall. It may be constructed of various materials, as stone, brick, or wood, each of which requires a separate consideration. The masonry of the ancients is yet unsurpassed. It is superior to that of modern times, not only in its exquisite finish, but also in strength and solidity, and in the gigantic size of its parts. We are accustomed to consider our age as far beyond any preceding one in the possession and use of mechanical power. Perhaps it is so; but the fact only increases our wonder when examining ancient works, and forces us into the belief that they were executed by an unheard of amount of toil, patience and expense. In old Egyptian architecture, particularly, it is not uncommon to find masonry composed of stones from twenty-five to thirty feet long, elevated to great heights, and evidently brought from great distances. In the great temple at Baalbec, built by the Romans, "about twenty feet from the ground, there are three stones, which alone occupy one hundred and eighty-two feet nine inches in length, by about twelve feet thick; two are sixty feet, and the third sixty-two feet nine inches in length." There are other great works which also seem to rival the might of Nature, and will, in all probability, stand until some convulsion occurs great enough to level the mountains. The masonry of the Egyptians was often highly finished, but the Greeks and Romans bear off the palm in this. Their walls were always elegant, the surface joints fitting with the utmost nicety, and the facings often being ornamented with bas reliefs

There were various methods which the ancients adopted in putting their masonry together, and those in present use are quite similar. Vitruvius designates them as the "opus incertum," or rubble work, the "isodomum," in which the courses were of equal heights, the "pseudisodomum," in which the heights were unequal, and the "emplectum," or ashlar-work. There was, besides, the "opus reticulatum," so called from its network appearance, the joints running diagonally, and the stones often having the shape of a rhombus or lozenge. This is usually considered a handsome wall, but is certainly weak, depending entirely on the cohesion of the mortar, and hence is undesirable.

The material used by the Greeks and Romans was principally marble, the best of which abounds in that part of the continent, and all their heaviest works were executed without mortar, as was also the case with the Egyptians. The mere weight of the masonry was sufficient to give it stability, but sometimes joggles and bonds of bronze were used. The common thickness of Grecian walls was seven or eight feet, but those of the Acropolis of Pharsalia are fifteen feet and a half thick. Sometimes each course was

a single row of blocks, but where the walls were of great thickness, as the Acropolis, the "emplectron" was used. Roman walls were generally lighter.

The masonry of the mediæval architects differed essentially from that which preceded it. They used almost universally granite or sandstone, and latterly built their walls quite light. Breadth is a characteristic of classical architecture, and height of mediæval architecture. During the age of the latter there seem to have been no powerful engines for raising weights, for in one building, foundation stones which "would resist the efforts of many men to lift," were believed to have been placed by a miracle. All the stones were generally such as one or two men could carry up a scaffold; and having discarded the heavy cornice, they were thus enabled to attain towering heights. The Normans, however, built very thick walls, filling the space between the outer and inner courses with rubble, rag masonry, or concrete. In the earlier times, the whole was of rubble or rag masonry, often, if not always, plastered without and within. The mediæval architects never gave so high a finish to their masonry and sculptured work as the Greeks and Romans, probably only because their style did not require, nor their material admit of it; but never, before nor since, has constructive masonry attained such perfection. The practice of the pointed arch belonged exclusively to the fraternity of freemasons, and the rules and principles which governed their labor were kept secret, and have been lost to them and to us. Even with the specimens before our eyes we are unable to fathom many of these principles, so that one of the greatest of modern architects, when viewing the arches, vaulting and tracery of one of these specimens, remarked that, so far from being able to construct another such, he could not tell even how to lay the first stone.

There are many other remains of ancient masonry scattered over the globe, which are interesting from their size and antiquity. We may instance Armenian masonry, which has joints fitted with the nicest art; the walls at Tiryns and Mycenæ, alluded to by Homer, and Stonehenge, the work of the Druids. In this country remains of ancient and excellent masonry have been found, the origin and object of which are unknown. A description of some of these has been published by the Smithsonian Institution.

The materials used in masonry at the present day may be classified as the granites, the sandstones and the limestones. Granite is an igneous rock, composed of grains of quartz, mica and feldspar, which having been partially fused, give to the mass a granular structure, whence its name. It is found in large quantities, having different degrees of hardness, and the various proportions of its components give it a great variety of color, though most usually it is gray. There is a species of granite termed by the mineralogists syenite, which contains in addition hornblende, and this is found to be the most durable. Granite is the strongest and most lasting material, but it is most suitable for a plain wall, both because of the difficulty in working it, and also because the effect of light and shadow is almost lost where its color is gray. The Quincy and Quarryville granites are perhaps the most celebrated in this country.

Sandstone is a less durable, but a much cheaper material. It is supposed to be an aqueous formation, the sand grains being cemented together by carbonate of lime and oxide of iron. In it also there is a con-

siderable variety of color, and indeed nothing can compare, for rich and highly finished work, with the brown sandstone, such as that obtained from Connecticut and New Jersey. Many sandstones are totally unfit for building, since after a short exposure they begin to decay. The public buildings at Washington are a lamentable instance of this fact.

Magnesian limestone was used in Gothic structures to some extent, and in St. Paul's at London, in all of which buildings the ornaments have until now retained their sharpness. It is believed that those specimens are best in which the quantities of lime and magnesia are most nearly equal. Marble seems best adapted to the classic orders. It is too glaring for a country house, and we may point to Grace church, N. Y., as an expensive instance of its inaptitude to the Gothic style.

There is one material which we wish we could dwell on at length, the serpentine rock, such as is found in Chester county, Pa. Nothing can be better for a certain class of cottages, its greenish hue giving it a rural expression of the most pleasing kind. The walls already built of it promise to last well, and we would recommend it, wherever it can be obtained, as a most excellent material, and more easily worked than any other, since it is soft when first quarried and hardens on exposure.

In constructive masonry mention may be made first of the rag work found in Norman buildings. The stones are flat, not often larger than a brick, and are laid horizontally. If the mortar be good, it makes an excellent wall, but is most useful for filling in. Herring-bone work differs from this in the stones being somewhat larger and laid aslant so that, with pieces of different lengths, we may obtain a smooth upper surface for the succeeding course by giving them different inclinations. The Normans sometimes used this externally for ornament, and it is found also in Roman work, but does not make a very good wall. Rubble or random work, the "incertum" of the Romans, consists in the use of stones irregular in shape and size, just as they come from the quarry, and fitting them together as well as possible in the wall, laying the largest near the foundation. This makes an excellent and handsome wall, especially for Gothic cottages. We have once before mentioned that the strength of this masonry depends greatly upon the quality of the mortar. Care must be taken by the mason to avoid this dependence wherever it is practicable, which he may do by laying the stones as flat as may be consistent with good appearance. Rubble is the cheapest masonry, excepting rag work, and answers excellently for filling in or backing, in which case the flatter the stones are the better.

Many granites split from the quarry in blocks with parallel surfaces, which have the same direction as the laminæ of the mica grains. Thus we are often enabled to obtain it in nearly the most desirable shape without the expense of dressing. A wall of these blocks is the best that can be made of undressed stone, and under the name of coursed work we may include with it masonry of dressed stone. The former is much more rural, and is therefore, as a general thing, better adapted for buildings in the country.

The last kind of masonry we need mention is that usually termed ashlar work. The outer course or facing of the wall is composed of dressed stone, and the backing is of different construction. The most

important point in this work is to use quick setting mortar, else the greater number of joints within may cause the wall to lean or crack in setting. It is hardly necessary to add, that in every species of masonry much attention must be given to the bonding. To enter upon this part of the subject would lead us beyond our limits, hence we can merely press its importance. The succeeding article will furnish some suggestions on the matter. The higher branches of the mason's art will be treated of hereafter.

The greatest objection to stone walls for country houses is the dampness to which they are liable. There are several methods which have been adopted to obviate this, the chief of which is to fasten strips to the wall within, to which laths are nailed for plastering. Thus the dampness cannot reach the interior, and the stratum of air between the plaster and the wall renders the apartments more easily warmed. The dampness which arises from the capillarity of the stone or mortar may be prevented by building in the wall near the ground, a course of clay slate, which is nearly impervious; this should be done in all cases. We cannot see why a first coat of asphalted plaster throughout the interior would not completely prevent dampness. Something of the kind must always be adopted, both for the walls and floor of a basement story.

There are many ways of giving variety to the appearance of stone walls which have not been mentioned. For instance, we have seen stone chips laid in all the surface joints and giving a very pretty effect to the exterior. We will not, however, delay longer on the subject, but close with the remark that, to our taste, stone walls are preferable to all others, because of their strength and durability, their naturalness, and their handsome, bold and truthful expression.

A SUBURBAN RESIDENCE.

DESIGN TWENTY-FIRST.

Plates LXXVI. and LXXXVII. present the front elevation and a perspective view of a three-storied country mansion. Its style is such as to give it the suburban character already referred to, and is equally adapted to an open country, or a park. The building is roofed with tin, and the walls are of brick, stuccoed or rough cast, without pointing.

Plate LXXXVIII. presents the floor plans of this design. There is a cellar under the back-building, having stairs under the private stairway, and also a furnace cellar beneath the hall communicating with the former, and having stairs under the main stairway. The principal division walls are of brick, as high as the floor of the third story. The plan of this story corresponds to that of the second story, main building; the whole thus affording ample accommodation for a family of eight or ten, including the servants.

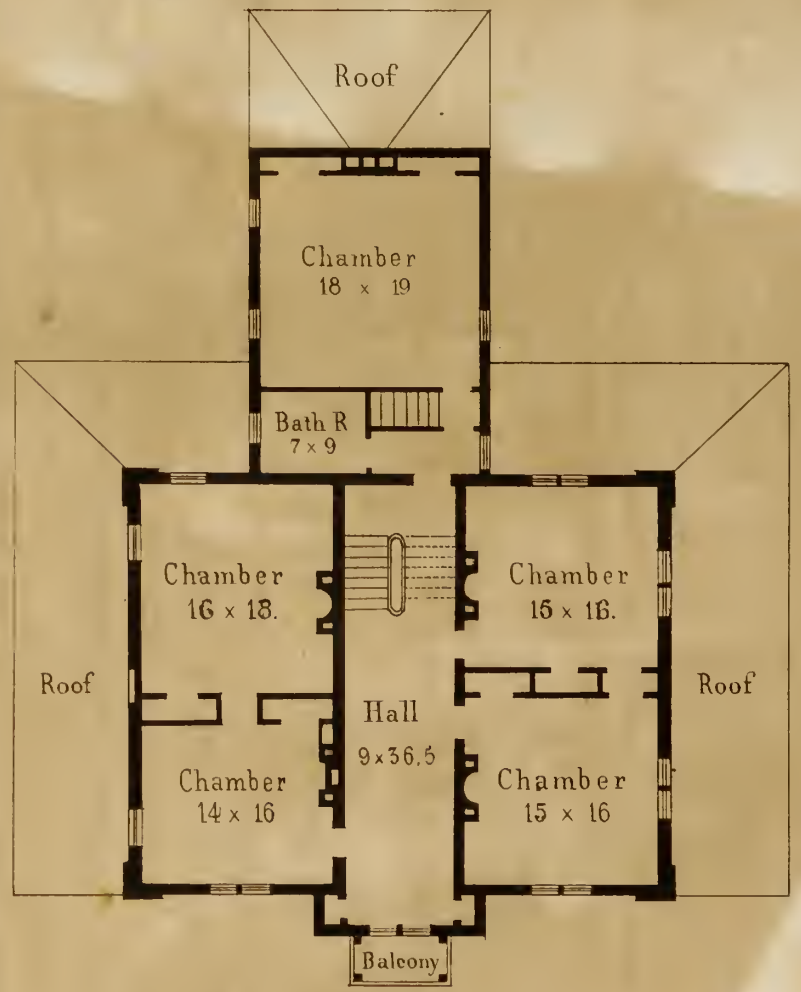
Plate LXXXIX. is of Details. Fig. 1. Details of the front door and balcony above. Fig. 2. Section of the balcony. Fig. 3. Chimney top and section. Fig. 4. Sill of the second story front window. Fig. 5. Cornice of the back building.

Plate XC. is also of Details. Fig. 1. Cornice and third story front window. Fig. 2. Profile of the bracket. Fig. 3. Ornament on the pediment. Fig. 4. Details of the verandahs. Fig. 5. First story front window. Fig. 6. Section of the same.

Sam[l] Sloan Arch[t]

Sam[l] Sloan Arch[t]

PRINCIPAL FLOOR.



SECOND FLOOR.

Scale 16 feet to the inch.

GROUND PLANS.

Fig 1

Fig 2.

Fig 3.

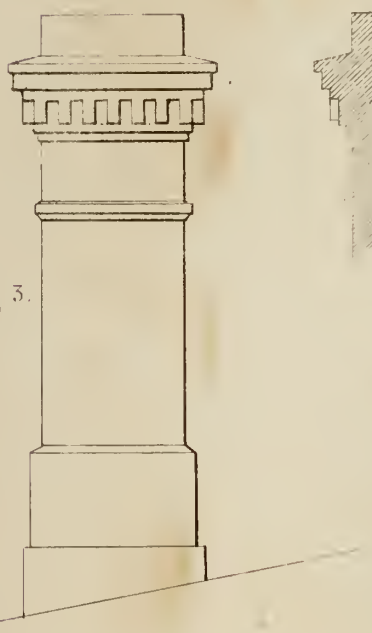


Fig 5

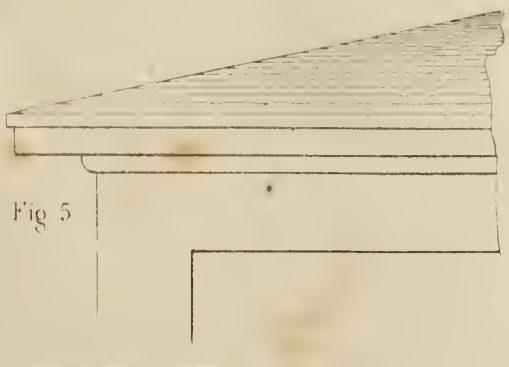
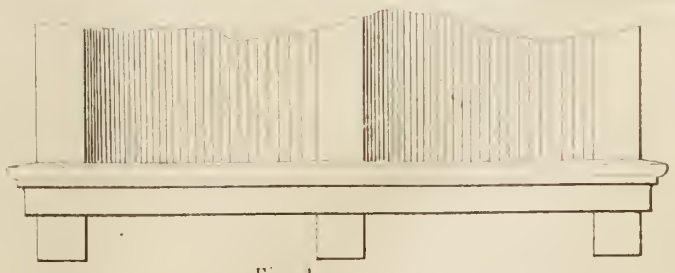


Fig 4



Scale 1/2 inch to the foot

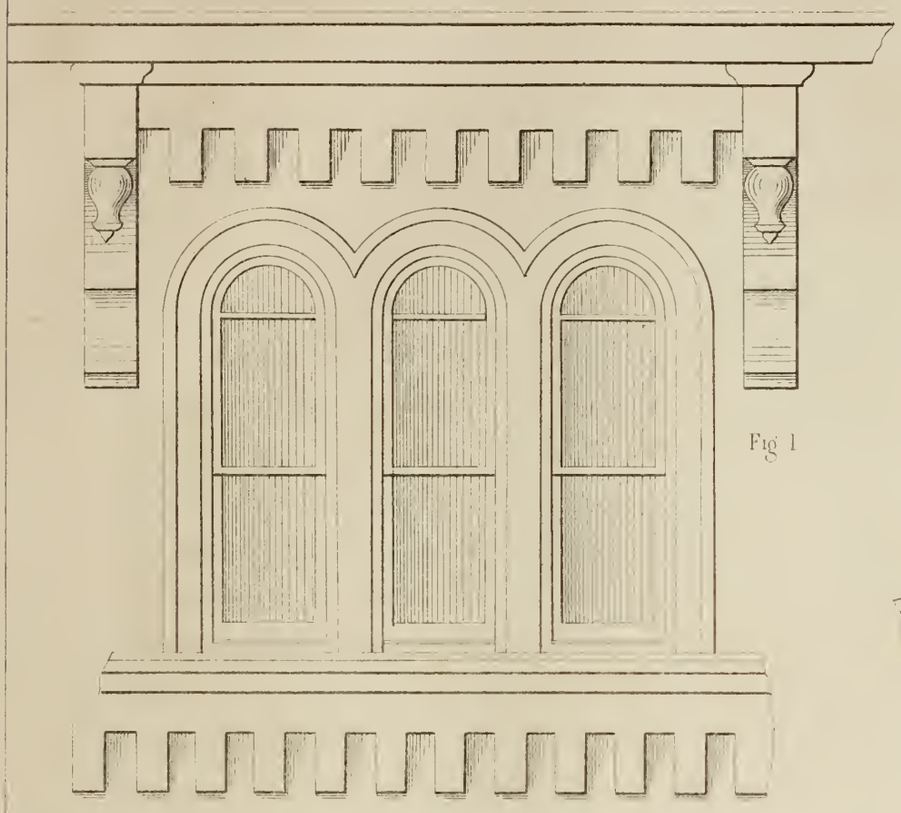


Fig 1

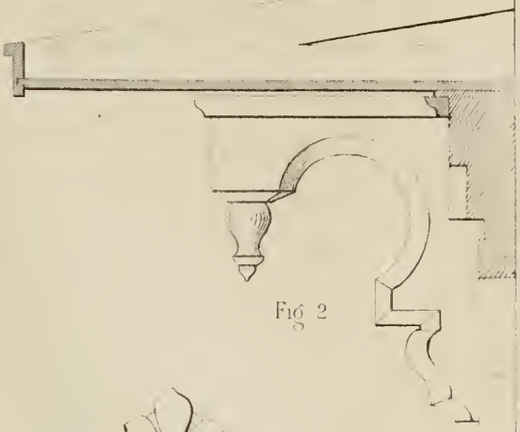


Fig 2

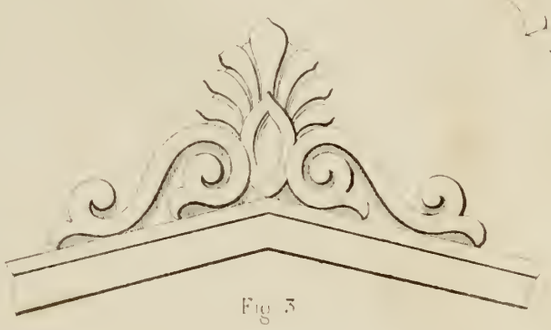


Fig 3

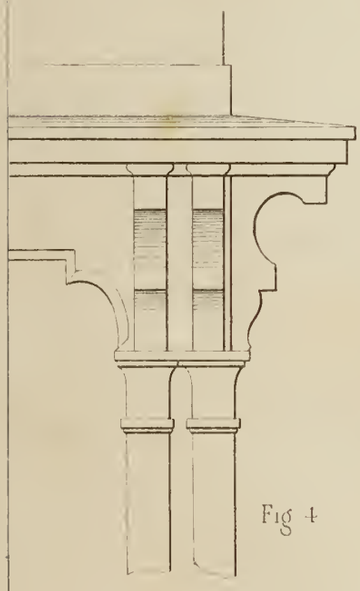


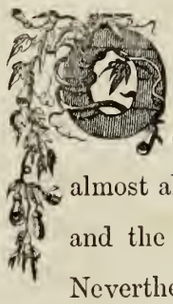
Fig 4

Fig 5

Fig 6

Scale ½ inch to the foot

BRICK WORK.



OUR every day acquaintance with the art of brick-making makes us familiar to a great extent, with its details. There is scarcely a member of the public, who has not at some time, if not often, seen the whole process, which, from its simplicity, is intelligible to any mind. It is almost always conducted in the open air, where every casual passer-by may inspect each operation, and the interest which all, at some period of life, have in building, also tends to excite curiosity. Nevertheless, however simple the grosser points may seem, the art is still capable of much improvement, and to produce our best bricks, a considerable degree of skill is requisite, resulting from care and long experience.

Good bricks must be sound and hard; they must be uniform in size, shape and color; and the manufacture must be so managed, that they may not warp or be otherwise injured. Their hardness, soundness, and uniformity of color depends mostly on the quality of the clay used. Alumina is the principal ingredient in all brick earth, but the purest clay, the great mass of which consists of this substance, will shrink and crack in drying, and warp in firing. To obviate this result, sand is mixed with the clay when it does not already exist in sufficient quantity. When these two substances alone, exist together, we have a fire clay suitable for making crucibles, glass-house pots, furnace-bricks, and like articles. From the expensiveness of these we may justly infer the difficulty of obtaining the compound; and it is the truth, that there is nearly always a greater or less amount of foreign matter intermingled. The presence of lime which acts as a flux often renders the clay useless, because of its liability to fusion. If oxide of iron be present, it also renders the clay fusible at a furnace heat, if the silica and alumina are in nearly equal proportion; hence, as oxide of iron almost always exists, care must be taken to have a considerably less quantity of sand than clay. It is this oxide of iron which gives the red color to nearly all our building bricks, and the white ones, which are sometimes used for filling in, are comparatively free from it and are generally much harder, though sometimes this absence of color results from over-burning.

Brick clay must be thoroughly worked in a pug mill before moulding, to increase its tenacity and secure a uniform mixture of its ingredients. When moulded, the bricks must be dried gradually, and uniformly, and the heat of the kiln must be well regulated into a slow and steady increase and decrease of intensity, or the bricks will crack and warp. "Sound and well burnt bricks are of a clear and steady color, and when struck together, will ring with a clear metallic sound. Deficiency in either of these points indicates inferiority."

The pressed bricks which give the smooth and finished appearance to our city fronts, are made by machinery and burnt in kilns built for the purpose, and not in the ordinary open stack. There has been no machine as yet invented that will make bricks so cheap as the old manual plan, which has been practised from time immemorial. It is one of those arts which has been nearly stationary ever since the time of the flood, and is the first of the series that ends in the manufacture of fine porcelain.

The shape of bricks is of considerable importance. That in present universal use, the Flemish brick, is perhaps, the best. There have been many attempts to improve it by giving such a shape as will facilitate the bonding, and thereby add security to the wall, but as yet none other has been generally adopted. In England hollow bricks are used to some extent, and their advantages are such as would warrant introduction into this country. They are at least one-third lighter than the ordinary bricks, and the difference of strength is small. Their size and shape is the same as the ordinary Flemish brick, but they differ in having a hole from end to end, which gives the qualities of a tube. As the size of bricks is unimportant so that they be thoroughly burnt, and easily handled, this latter kind might be made much larger, and would then present a better appearance in the wall. We are not satisfied, however, that their resistance to a crushing force is sufficient; it certainly cannot equal that of the ordinary bricks; still they might be used with advantage over lintels.

Walls are built with much less thickness now than formerly, and in fact a false economy so influences our builders, that as a general thing, they are made much too thin. They are named according to the number of bricks used in the breadth of each course; thus we have a wall one brick thick, a brick and a half, two bricks, and so on; corresponding respectively to an eight inch, a twelve inch, and a sixteen inch wall. They are best made heavy at the base, and carried up lighter and lighter, the diminution occurring at each tier of joists. Partition walls seldom need be made more than one brick thick, unless they have to support heavy weights, such as girders. Hollow walls are coming into very general use, especially for country mansions, and are certainly a great improvement. They are much lighter than ordinary walls, requiring only about one-third the number of bricks, and are sufficiently strong. They prevent dampness, completely, and render the building more easily warmed. To describe the various methods of constructing them, would require considerable space and are generally understood by bricklayers; we therefore merely recommend them in all cases where they are practicable.

In speaking of bonding we may premise that those bricks laid lengthwise in the wall are called stretchers, and those laid across are called headers. For solid walls there are two principal kinds of bonding, the Flemish and the English. In the Flemish bond the stretchers and headers alternate in each course, and the headers in the succeeding course are laid on the middle of the stretchers in the course below. In the English bond the courses are alternately of headers and stretchers, and so arranged as to break joints throughout. It is generally conceded that the Flemish bond is the most agreeable to the eye, and nearly all of our old brick buildings are thus built, but there is no doubt at the same time, that the English bond

makes much the strongest wall, and hence, wherever a wall is to be rough-cast, this bond should always be adopted. It is more necessary to urge this because of late years, much of the strength of walls has been sacrificed to appearance. Brick facings are now made almost entirely of stretchers, every seventh or tenth course being of headers, and sometimes there are no headers in the face of the wall whatever. This is a bad practice, but is somewhat compensated by the use of iron strap bonding, which consists in laying pieces of hoop iron in the mortar joints and gives effectual security. We must, however, reprobate the entire use of stretchers on the face of the wall, and cannot admit the plea of appearance, for to one acquainted with the subject, and he only can properly judge, it carries with it a sense of insecurity utterly inconsistent with agreeable appearance.

Another point must be attended to in laying bricks, which is not to carry up one portion of a wall more rapidly than another, otherwise, owing to an inequality of settlement, it will inevitably sustain fractures. Again, if the building be conducted in very dry weather, the bricks should be wetted, as they are laid, or the moisture of the mortar will be rapidly absorbed by them before it can properly adhere.

The practice of introducing concealed arches for the purpose of distributing the weight more equally, is a good one, when exercised with judgment. Inverted arches may be turned from pier to pier beneath openings, but care must be taken that the corner be a sufficient abutment, or in settling it may be pushed outwards below. Over long lintels, arches are often turned to advantage, and the only difficulty in their free use, is owing to their unyielding nature, which may create an inequality of settlement, and thus most certainly cause fractures.

Bricks are frequently and advantageously used for backing in ashlar work, but it requires a skillful workman to build a secure wall of this character. We consider too, this mode of building at variance with good taste, for it is a deception, and the attempt to deceive is altogether repugnant to feelings of pleasure which might otherwise arise. Sun-dried bricks are used occasionally for filling in a brick wall, and sometimes the entire wall is built of them, but only when economy is of primary importance.

Modern architects have for a long time shown a great disrespect for brick walls; why, it is difficult to determine. The public have acted very differently, and urged by motives of economy, have built the principal part of our cities and towns of this cheap and durable material. Architects have been compelled to acquiesce, but always exhibit a great desire to hide the bricks with plaster, and have not, till very lately, made any attempts to give architectural effect to this legitimate and excellent material. Chiefly on account of its prevailing color, we do not think brick work well adapted to country houses, but for city architecture it is entirely proper, and recent attempts show conclusively, that it is susceptible of a high degree of embellishment peculiar to itself. There is no doubt but the prejudice must give way.

No art is more ancient than brick-making, if we except the art of Tubal Cain. The tower of Babel, so much of it as was built, was of bricks, and there are some very curious records of the art as practiced by Egypt. Beside the scripture account, we have some of their characteristic pictures, which exhibit the

whole process, both for burnt and unburnt bricks, and evidently tend to confirm that account. From them, the art spread throughout the East, and was practised to some extent by the Grecians. From these the Romans received it and carried it to a perfection never since attained. The shape of their bricks generally differs from ours. They were seldom more than an inch and a half thick, and varied in size, the smallest being about seven inches square. Many specimens of Roman brick work are yet extant, showing at once the excellence of the work and the durability of the material, though they chiefly owe their continued existence to the quality of the mortar. Generally the wall was stuccoed, but there are some ornamental walls of bricks beautifully designed and finished. From Italy the art spread northward, and was carried by the Romans themselves into Britain. In some Gothic structures bricks were used, and they are found in old Saxon buildings which are believed to have been erected either during or immediately succeeding the presence of Roman power. There is no doubt but that the peculiarities of the Norman style originated in the use of bricks. Their characteristic mouldings, the zig-zag, the alternate billet, the lozenge and others, have all been found constructed of bricks. Since then bricks have been adopted only for plain walls, except in some cases where they were rudely sculptured after being laid, but we have, as before intimated, reason to hope that this branch of practical architecture will soon be greatly improved.

A COTTAGE.

DESIGN TWENTY-SECOND.

Plates XCI. and XCII. exhibit the front and side elevations of a comparatively plain country dwelling whose unostentatious simple appearance as well as internal arrangements, give it every requisite for a gentleman's farm house. The roof is designed to be slate and the walls brick or stone, rough cast without pointing.

Plate XCIII. comprises the ground plans. There should be a cellar beneath the whole building, having stairs under the private stairway, and also an outside cellar door and stairs in the rear. The accommodations are sufficient for a family of six or eight persons, and the cost of the building would be about $3800.00.

Plate XCIV. is of Details. Fig. 1. Drip ornament of the gable eaves. Fig. 2. Oriel window. Fig. 3. Section of the same. Fig. 4. Hood mould of the front gable first-story window. Fig. 5. Details of the verandah. Fig. 6. Section of the verandah.

SUMMER HOUSES.

DESIGN TWENTY-THIRD.

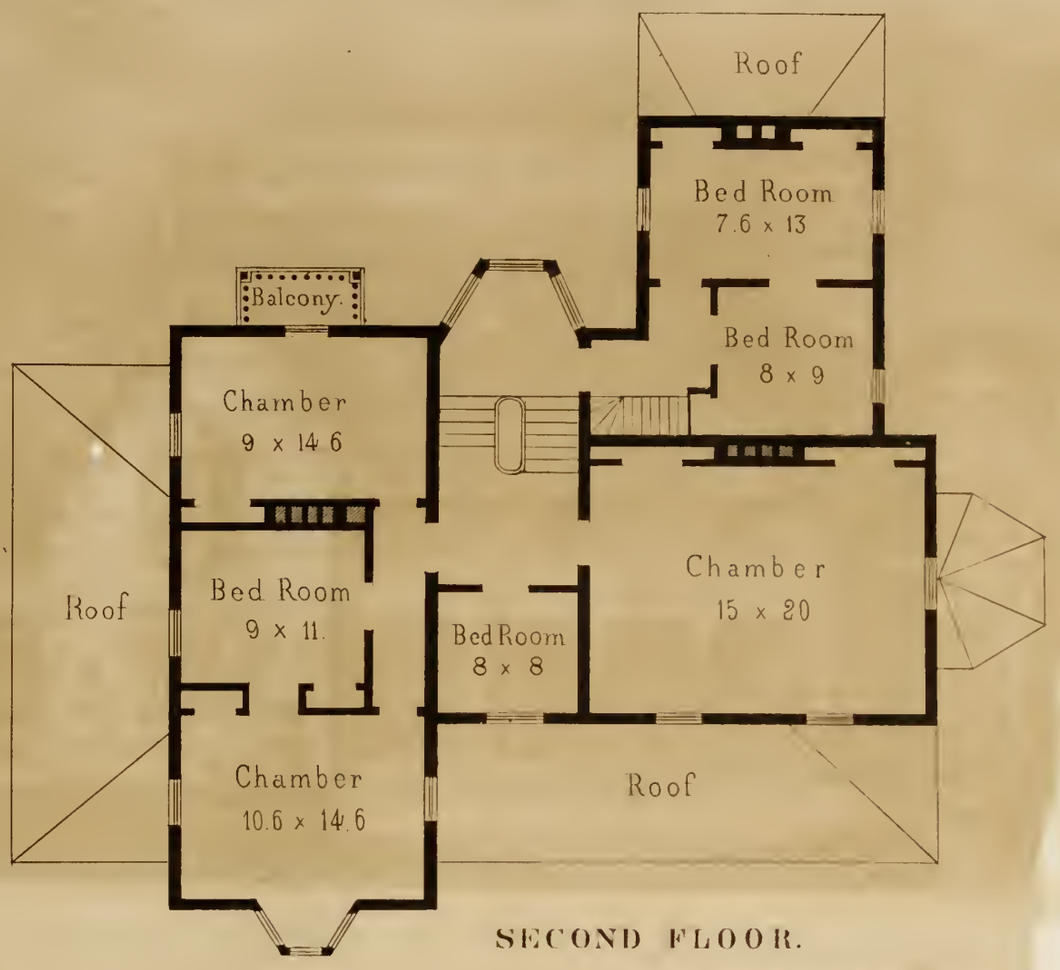
On plate XCV. will be found a design for four summer houses, two in the Oriental style, and well adapted to the Villa, design XVIII. It is needless to remark upon them further as they speak for themselves.

Sam[l] Sloan Arch[t] P.S. Duval's & Co. Steam Lith. press Ph.

FRONT ELEVATION.

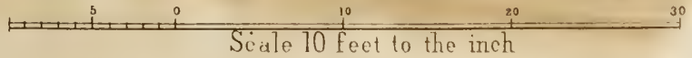
Sam[l] Sloan Arch[t] P.S. Duval's & Co. Steam Lith. press Ph.

A COTTAGE.



SECOND FLOOR.

PRINCIPAL FLOOR



Scale 10 feet to the inch

GROUND PLANS.

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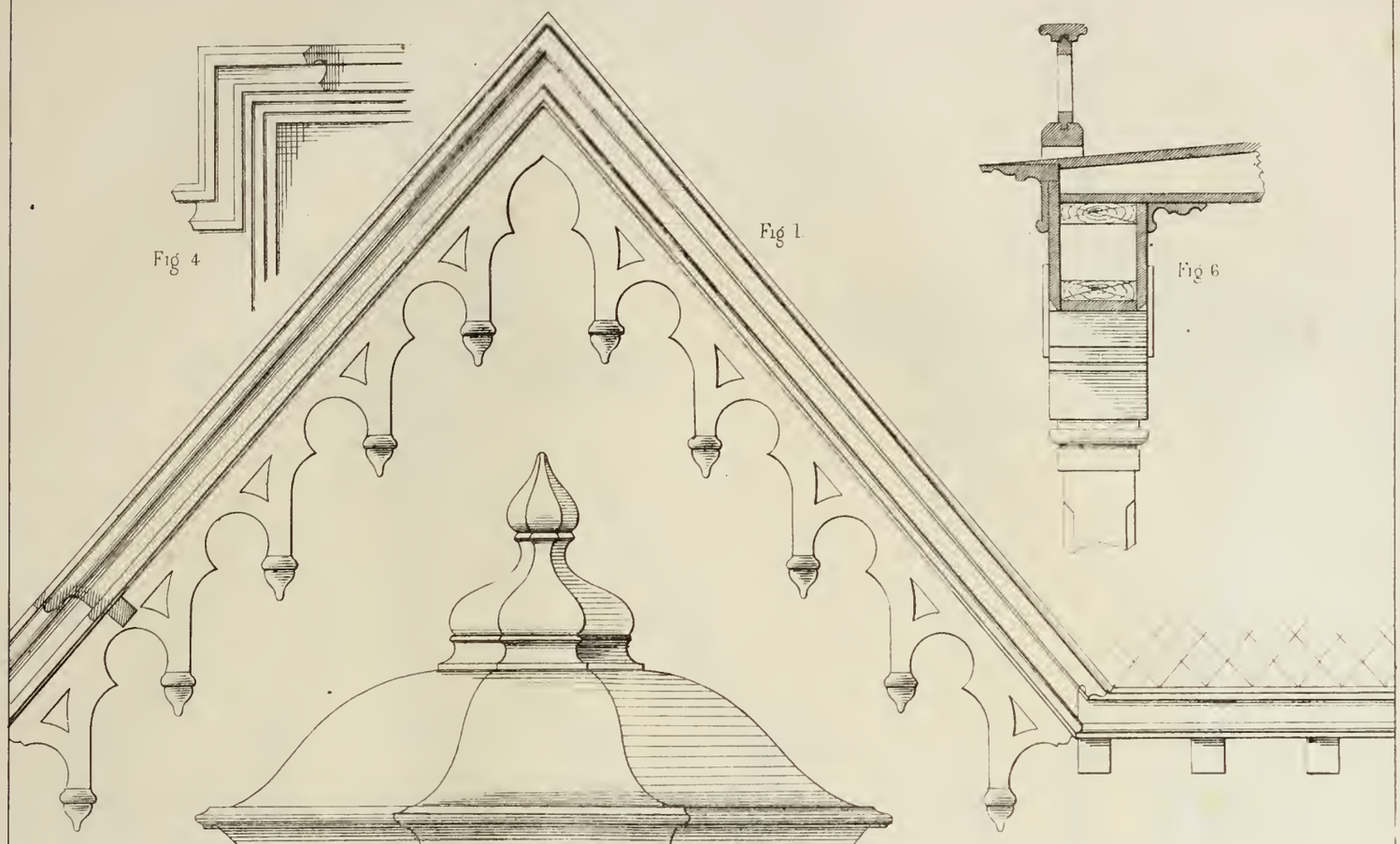


Fig 1.

Fig 4

Fig 6

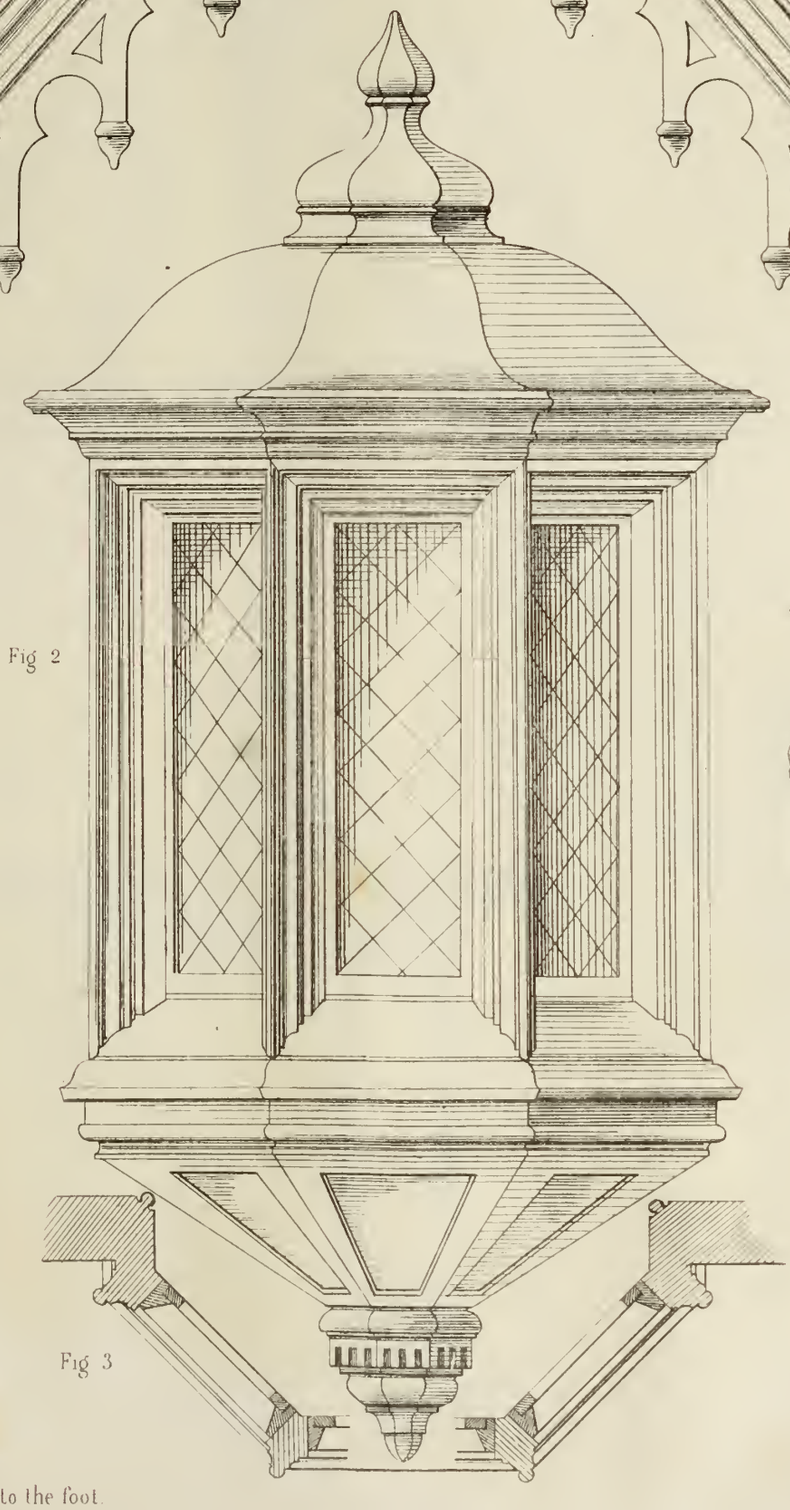


Fig 2

Fig 3

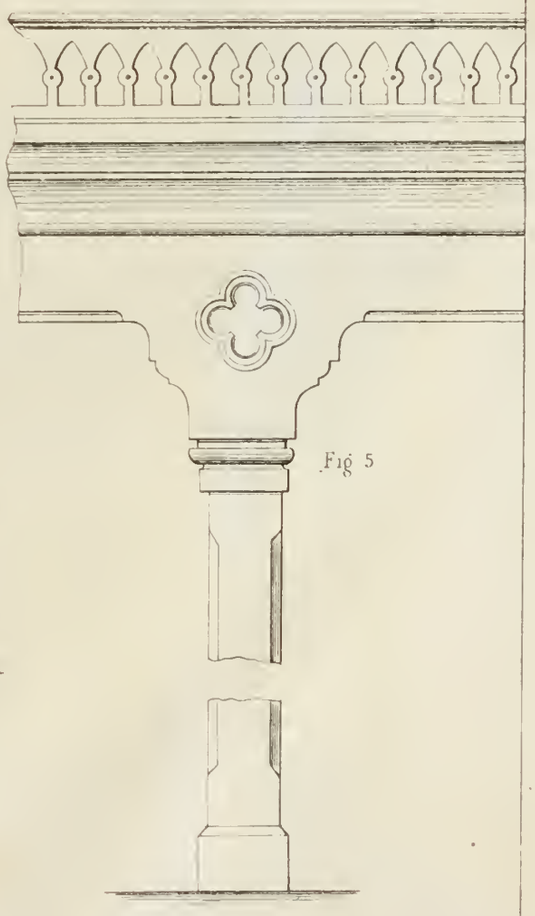


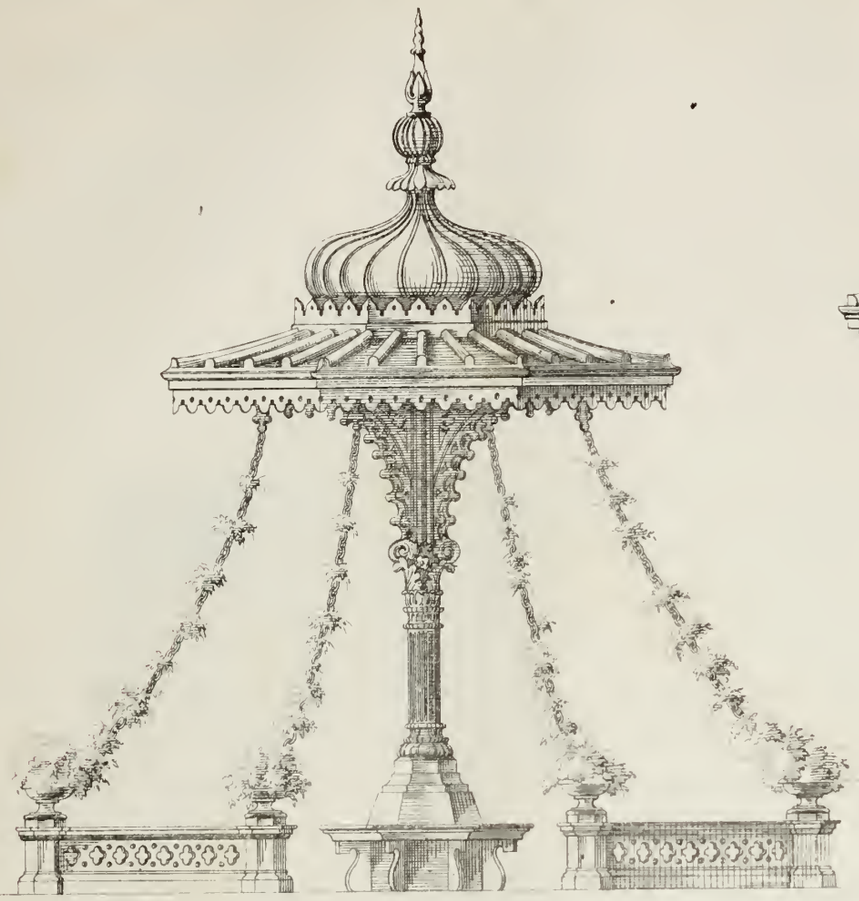
Fig 5

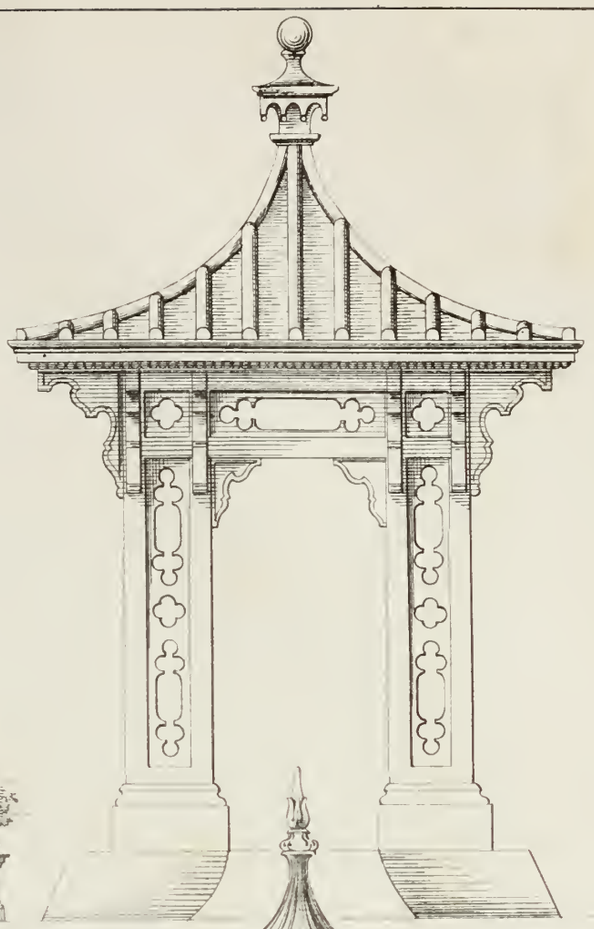
Scale ½ inch to the foot.

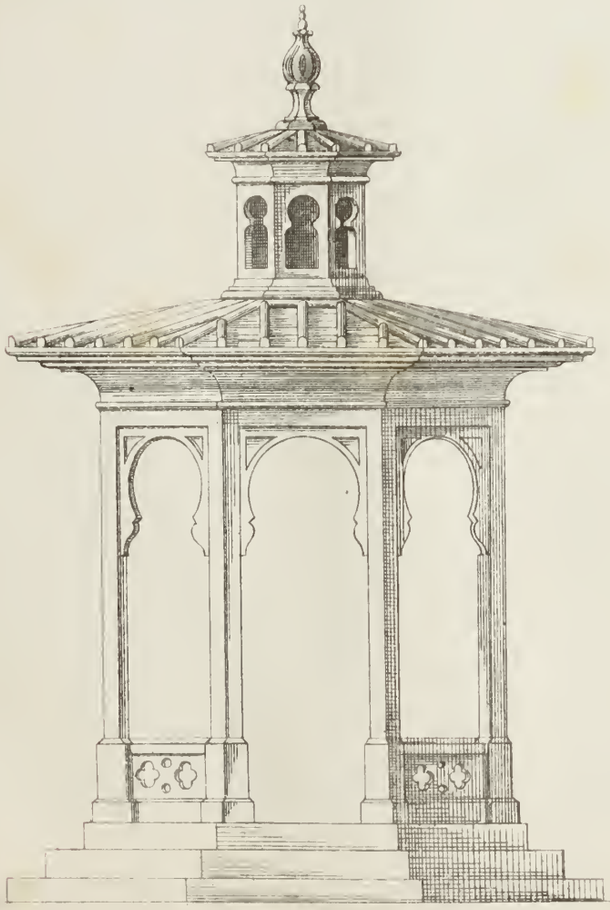
San.l Sloan Archt

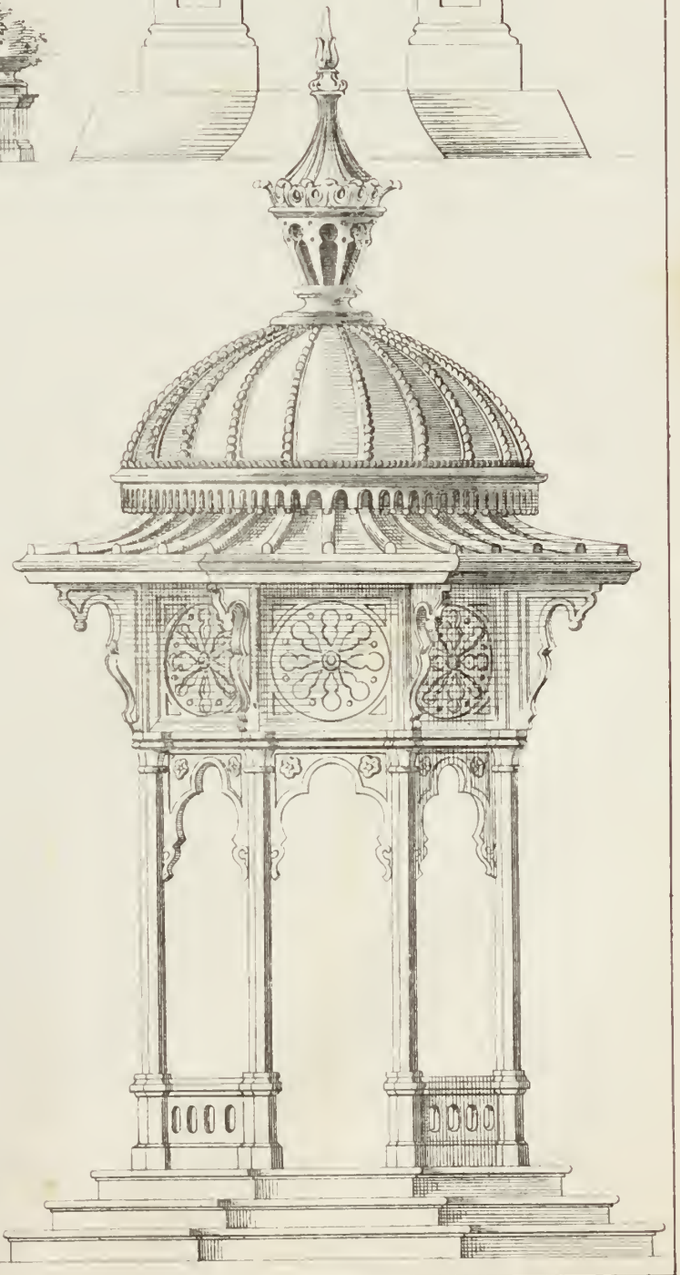
P. S. Duval & Sons Steam lith Press Phila.a

DETAILS.









Scale 4 feet to the inch

Sam.l Sloan Arch.t

T. S. Duval & Cos Steam lith Press Phila.a

SUMMER HOUSES.

TIMBER.

WHO has not looked upon the mighty forests of America with admiration? Mighty not only in their extent and density, but in the greatness of each member. Admirable too in their almost infinite variety of flowering and fruit bearing exogens bounded by the pines of the North and the palms of the South. In Europe, the teeming population have long been thinning the noble ranks of trees, but here, though they have shrunk from the approach of civilization like frost-work from the breath, yet their vast extent is undiminished, and they still retain their primitive luxuriance and grandeur. The rapid and monstrous growth of our necessities has produced a proportionate increase in the demand on these sons of the soil. We lose in every forest felled, a volume of eloquence and beauty. What landscape is complete without majestic woods, and what more elevates the thought than to contemplate such handiwork of Nature? Touched with their superior power to humble yet expand the soul, our lyric poet says:—

"The groves were God's first temples. Ere man learned
To hew the shaft, and lay the architrave,
And spread the roof above them,—ere he framed
The lofty vault to gather and roll back
The sound of anthems,—in the darkling wood,
Amidst the cool and silence, he knelt down
And offered to the Mightiest solemn thanks
And supplication."

We can never see Nature's architecture destroyed without feeling a regret. When the axe with resounding stroke descends again and again on the sturdy trunk, and the noble tree with its wide spreading top of branches and leaves, with all its vivified machinery for growth and reproduction, sways, reels, and falls in crashing thunder down, we are forced to relieve our painful impression by considering the necessity of the act, but still feel as if evil has been done that good may come. A healthy mind abhors needless destruction of life, of beauty, of utility, or the undoing of whatever cannot be at once identically restored. These thoughts may seem somewhat irrelevant to the practical subject in hand, but there have been few protesting voices raised against the wanton waste of our trees. Viewing these immense forests at a glance, one would be inclined to laugh at the idea of their exhaustion, but it must be remembered, that the greater portion of them is useless for timber, and that only a small

portion of the valuable part is accessible. Still we do not contemplate exhaustion, but an advanced cost may readily be conceived that will render it impossible for every poor man to have a home. The inroads upon our invaluable live oak have already so far diminished its quantity that the Government has found it necessary to interfere and encourage the planting of acorns, in order to prevent its entire extinction. The Cinchona nitida of South America, which species furnished much the best bark of commerce described in the Materia Medica, has become totally extinct, because of this reckless treatment. No power, however, can induce a careful and judicious management of our forests, for our countrymen in their individual action, always will show a total disregard for posterity so long as families are unsettled, and estates so liable to disruption. In Europe, the laws of primogeniture have done much to preserve the forests and encourage the cultivation of timber, but we are happy, nevertheless, in the entire absence of this system.

It has already been remarked that only a small part of our great forests can be used for timber. An insufficiency of size or an inferior quality of wood, will render any species useless. The most important of those not thus disqualified, are here briefly described.

Forests of Pine, Spruce and the other species belonging to the same family (*Coniferæ*) abound in every section of the United States, and furnish by far the greatest amount of timber. Of these, the pine exists in much the largest quantity, and together they more than double in extent all other useful trees. The general qualities of the wood which they furnish are very similar, and owing to its abundance, the timber can generally be obtained at a much less rate than any other material. The ease with which it is worked, and its lightness, tend much to lessen this cost and enhance its value. The grain is smooth and firm, and the body of the tree is quite free from knots, the branches putting forth only near the extreme top. The great length of the trunk from this point to the ground, its strength, lightness and durability, in which last it at least equals many of the oaks, form a combination of good qualities possessed by none other. They fit it admirably for building, and therefore it is used in vast quantity. Indeed, except in cities where brick and stone are required, about nine-tenths of our buildings are constructed entirely of it, and even where other material is used for the wall, the rafters, girders, joists, floors and dressings of every description, are almost always of these woods. We may mention that the value of the trees, especially the pine extends much further. Immense quantities are used in this country for ship-building, and the exportation of the timber for this and other purposes forms a most important branch of our commerce. There are many other uses which render these trees invaluable. From a species of pine all the resin is obtained which furnishes the important products, spirits of turpentine, rosin, tar, and pitch; and besides, the wood is much prized as fuel either when reduced to charcoal, or by using the knots and other highly resinous parts wherever much flame is required, as in brickmaking, or on steamboats.

There are many species of pine, but only a few serve the purpose of the carpenter and joiner; the Southern Yellow or Pitch pine (*Pinus palustris*) being in this respect, perhaps, as well as in others, the most important. It first occurs in the southern part of Virginia, and from thence extends along the entire coast

of the ocean and gulf, not reaching inland more than a hundred and fifty miles. It is termed at the North the Southern Carolina, or red pine, and at the South, the yellow or pitch pine, but the proper name, according to Michaux, probably our best authority, is the long leaved pine, the length of the leaves being about a foot, which characterizes the species; we have adopted the other name, however, because it makes more special reference to the qualities of the timber. This tree attains the height of eighty feet, and often is from sixteen to eighteen inches in diameter, for two-thirds of that distance, the foliage in the larger trees not occurring within sixty feet of the base. It has, however, from an inch and a half to two inches of useless sap-wood, which is the newly formed wood next the bark. In deep and dry, though not rich mould, this tree attains its greatest size, but on the sea coast, where a shallow soil overlays sand, it is smaller, more branching, and contains a greater amount of resin. In the first case it is called the yellow pine, and in the latter, the pitch pine. Regarding its resin alone, for this tree yields very nearly the whole of that article in trade, it is the most important of the species, but at the same time its wood is the firmest and most durable of all the pines. On this account preference is given to it before any other in naval architecture, especially the variety called red pine, the wood of which acquires that hue from the nature of the soil. The carpenters of the North have it in great demand for all parts of the building, especially for floors and step-boards, since it suffers comparatively little in wear, and but for its higher price they would use it exclusively. At the South, within its localities, the wood work of all buildings is constructed entirely of this material. The remarkable durability of the wood results chiefly from its pores being filled with resin, and it is besides strong, firm, smooth, even grained, and under varnish, has a rich yellow appearance. These qualities would seem to fit it admirably for the joiner, and the only objections are, its liability to shrink both longitudinally and laterally, especially in the soft grain; and the effect of the summer heat in causing the resin to exude and discolor the paint. The white pine (*P. strobus*) is next in importance,and is more extensively used in this region than any other. The tree is the largest of the species, excepting the Rocky Mountain pine, for it sometimes reaches the height of a hundred and eighty feet by six in diameter, and contains only about a half inch of sap-wood. Hence boards can be obtained from it of great length and width, but owing to the rapid diminution of the trunk towards the top, it does not furnish timber as large in proportion to its size as other species. It is found in immense quantities from New York northward throughout the Canadas, and also along the Allegheny mountains. It is still quite abundant, though disappearing fast, on the head waters of the Delaware, whence it is floated to supply the towns on the shore. Much is brought down the Susquehannah, and it is also floated down the Ohio and Mississippi, even as far as New Orleans. Large quantities are exported from Maine and the shores of Lake Champlain. The qualities and uses of the wood are too familiar to require much detail. It is very durable when well protected from the weather, light, free from knots, smooth, and more easily worked than any other wood, and hence, although liable to swell with moisture, is a favorite with the carver and joiner. In carpentry it should not be used extensively, not being very strong, but for joinery it is excellent, when not exposed to

humidity, though owing to its softness and weakness, a slight blow is often sufficient to destroy or deface the best work. This tree is very valuable in furnishing masts, yards and other parts of vessels. Large quantities are used for packing boxes and a thousand other things, in which a light and easily worked material is required. The true Yellow pine (*P. mitis*) is more valuable than any other in the Middle States, where it chiefly abounds. It is also called the yellow spruce, and in Georgia, the short leaved pine. It has a diminishing trunk fifty or sixty feet in height, with a diameter of fifteen or eighteen inches, but at the South it grows much larger though more sparingly. The sap wood, which speedily decays, is about two or two and a half inches in depth. A vast quantity of the timber is used in the dock-yards of the Middle States for all parts of the ship, and it is exported to some extent. We quote Michaux :—"The heart is fine grained and moderately resinous being compact without great weight. Long experience has proved its excellence and durability. In the northern Middle States and Virginia, nine-tenths of the houses are built entirely of wood, and the floors, the casings of the doors and wainscots, the sashes of the windows, etc., are made of this species as more solid and durable than any other indigenous wood." This last was true when written, but we may regret that its place with the joiner is now so much occupied by the cheaper and softer, although in itself excellent white pine. Poor soils furnish a fine, smooth, and compact wood that cannot be surpassed. For joists, girders, and all heavy framing, it is next in value to the long leaved or southern yellow pine, and in this region is used very extensively for these parts of the building. There is another species occurring principally in the Atlantic States, which deserves mention, this is the Pitch pine (*P. rigida.*) It grows to some extent throughout the United States in meagre soil, and abounds on the Allegheny mountains in Pennsylvania and Virginia. The height of the tree is about thirty-five or forty feet by twelve or fifteen inches in diameter, but in swamps it grows much larger; the wood in the latter case, however, being nearly all sap, is therefore useless. The better sort have numerous branches, the timber is knotty but compact, heavy, full of resin, and resists rot better than any other, excepting the southern pitch pine. The Red Canadian pine (*P. rubra*) receives its name from the clear red color of the bark, and is widely distributed throughout the Canadas and Maine. The tree is quite large, and yields broad, heavy, resinous, compact, and durable planks, fifty feet long, which are chiefly used in ship-building, and large quantities are exported for this purpose.

There are several other genera of this family which may be mentioned collectively; the first of these, is the Spruce, (*Abies,*) the same as the fir in Europe, which is distinguished from the pine in classification, by having no sheath around the base of the leaves. The Black or Double spruce, (*A. nigra*) naturally belongs to cold regions, having in this latitude only a stunted growth. The Black Mountain in South Carolina, is covered with it, the dark hue of the leaves having a gloomy appearance. Sometimes it is called red spruce, from the color of the wood. The tree is seventy or eighty feet high by fifteen or twenty inches in diameter, and suffers a regular diminution from the base to the top. The wood is strong, light, and elastic, being tougher than white pine but more liable to crack. It is exported from Maine to most of the northern

ports, where it is used for all parts of the frame, and is generally considered much better than hemlock spruce. The Hemlock spruce (*A. Canadensis*) is common from Hudson's bay, southward throughout Vermont, and on the Alleghanies. The tree is seventy or eighty feet high, and has a uniform diameter of six or nine feet for two-thirds of its height. The wood is as durable as any other when guarded, but decays rapidly when exposed. The fibre makes frequent circuits of the stock, the grain is therefore irregular and coarse; the wood is firmer than white pine, gives a better hold to nails, and is esteemed for its rigidity. There is another member of this series, very valuable in the South and South-west, where it abounds, the Cypress (*Taxodium distichum.*) It grows mostly in swamps and marshy ground, and hence is generally difficult of access; nevertheless, all the wooden houses in New Orleans and around, are built of it almost entirely. The wood is lighter, and much more durable than pine; strong, elastic, fine-grained, and possesses the property of long resisting the heat and moisture of that climate. On account of these qualities it is especially esteemed for shingles, and large quantities are exported to the North. They will last, if cut in the winter, forty years. The White Cedar, (*Cupressus thyoides,*) which makes excellent joiner's work, is also highly valued for shingles, being considered in many points much better than the cypress, and therefore commanding a higher price. It is much more durable and secure from worms than white pine, shingles of which will last not more than fifteen or twenty years. The American Larch would be our most valuable tree did it exist in sufficient quantity, inasmuch as it is better in every respect than any pine.

The Oak (*Quercus*) is the only other genus which is comparatively of great importance to us in house-building. For this purpose, it is in some respects inferior to pine, and in others superior. Being less plentiful and less easily worked, it is not so cheap; and this, together with the weight and inferior size of the timber, prevent its exclusive use. There is, however, no other wood so strong, firm, and durable, none which in all respects, repays so well the first cost. It is justly esteemed in the better sort of joinery. A material which may be exposed in fine work, always makes a better and more pleasant impression on the spectator than any paint can give; hence our furniture is so seldom painted, and indeed, the mere fact that the material has cost more, and the work has required more labor and skill, adds to this impression. We have no indigenous wood, unless it be the curled maple, superior in these respects to oak. In all ornamental work it has a beautiful rich appearance, which increases with age. This tree is not valuable in building houses alone. It is of the greatest national importance for ship-building, and thousands are hewn for this purpose every year. But it would be impossible within these limits even to name the almost infinite variety of uses to which it is applied. The different species of oak are widely distributed over the northern temperate zone, to which it is almost exclusively confined.

The European Oak (*Q. robor*) is a species of which unfortunately, we are not possessed, though its eminent qualities render its introduction very desirable, and we need only remark that it surpasses in every respect, all other oaks, unless it be our live oak, which in a few points excels. This species, the Live Oak,

(Q. *virens*,) furnishes the finest timber in the world for strength and durability when not exposed to changes of wet and dry. The tree, however, is not very large, it being difficult to obtain a stick of timber thirty feet long by a foot square, but the irregular growth of its wide spreading top, furnishes many knees for ships, and it is on this account invaluable. It is found from the lower part of Virginia all along the southern coasts in a narrow strip only twenty or twenty-five miles wide, thus seeming to require the sea air. It is this oak that our Government has endeavored to protect from practical annihilation in consequence of large exportation, home consumption, and clearance of lands valuable for cotton; but these and its slow growth, have already produced a great advance in price. Because of this, it is little used in building, although strong, firm, compact, fine-grained, smooth, durable and better in every respect than any other of our oaks. The White Oak, (*Q. alba*,) so called from the light colored bark and wood, is generally considered a variety of the European Oak. This species is at present the most important, and because of its great size, best adapted to building purposes. It is the largest of the genus, often being six feet in diameter, by seventy-five or eighty feet high. It is found in all parts of the United States, but there are only a few localities where it sufficiently abounds to render it of great service. Throughout the Middle States it grows in large quantities, and is used extensively. In ship building it is of the highest national importance, being next in value to the live oak, and the wood is applied to an infinite variety of other purposes. Whenever the price permits, it is much used in the frame work of houses, and is invaluable in such parts of the building as are exposed to alternate moisture and dryness, since it supports these admirably. In joinery it makes excellent work, though somewhat liable to shrink, warp, and crack, and when varnished or polished, has a rich elegant appearance, well adapted for furniture. The wood is strong, neither breaking or splitting easily, hard, fine-grained, and smooth, of the greatest durability, and not very difficult to work. The other oaks are not so important, and may be briefly noted. The Post Oak is abundant south of latitude 40° and is usually considered near akin to the white oak, though its comparatively small size, prevents extensive use. The wood has a finer texture, more strength and durability, but is not so elastic. The Black oak is abundant in the Middle States and southward. The tree is ninety feet high by four in diameter. Its wood is reddish, coarse, and has large empty pores, but is strong and durable, and frequently substituted for white oak, which, in some places, is much more expensive. Immense quantities of the red oak barrel staves are made from this tree, and the bark is valuable in both tanning and dyeing.

There are many other valuable indigenous trees, among which the Black Walnut (*Juglans nigra*) is chief. It is found throughout the United States in considerable quantity. The tree attains the height of sixty or seventy feet by three or four in diameter, and furnishes a wood the sap of which decays quickly, but the heart is sound, durable, light and smooth, though splitting easily. It has a rich, dark hue, which is prized in joinery and for furniture, but the wood being quite soft the least blow cracks the varnish and leaves its mark. There is no wood, however, more beautiful for these purposes than that kind of the Red

Sam.l Sloan Arch.t

P.S.Duval & Co.s Steam Lith. Press, Phil.a

SIDE ELEVATION.

Sam.l Sloan Arch.t

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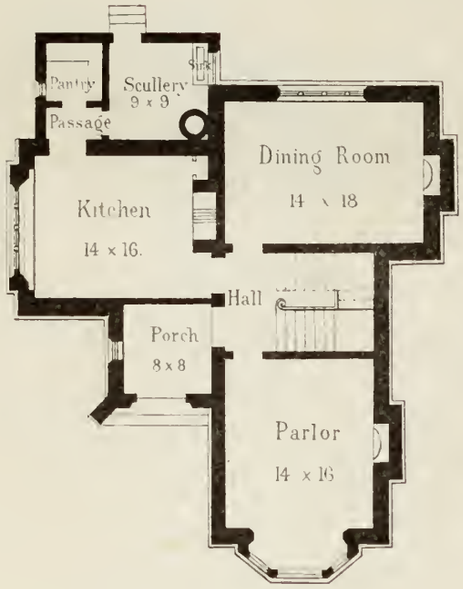
AN OLD ENGLISH COTTAGE.

CELLAR FLOOR



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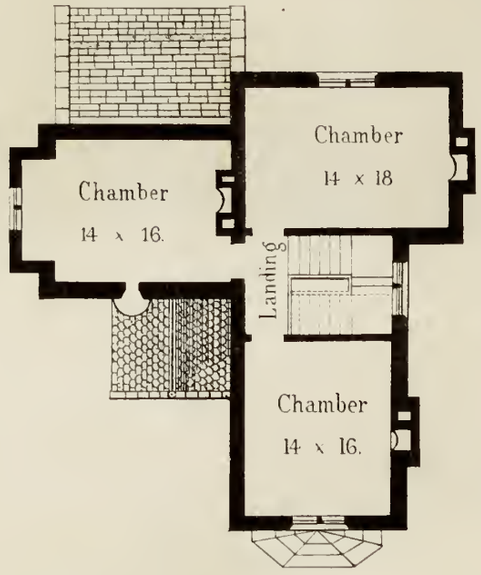

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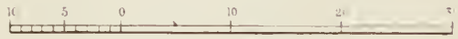


Scale 16 feet to the inch

GROUND PLANS.

Scott Stearns Archt.

P. S. Duval & Cos Steam lith Press Philad.a

Fig 1.

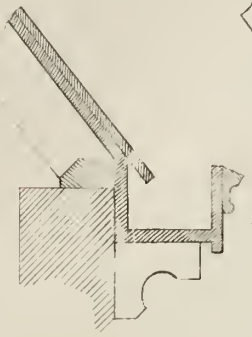


Fig 2.

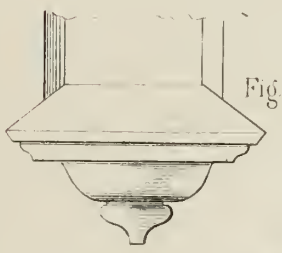


Fig 3

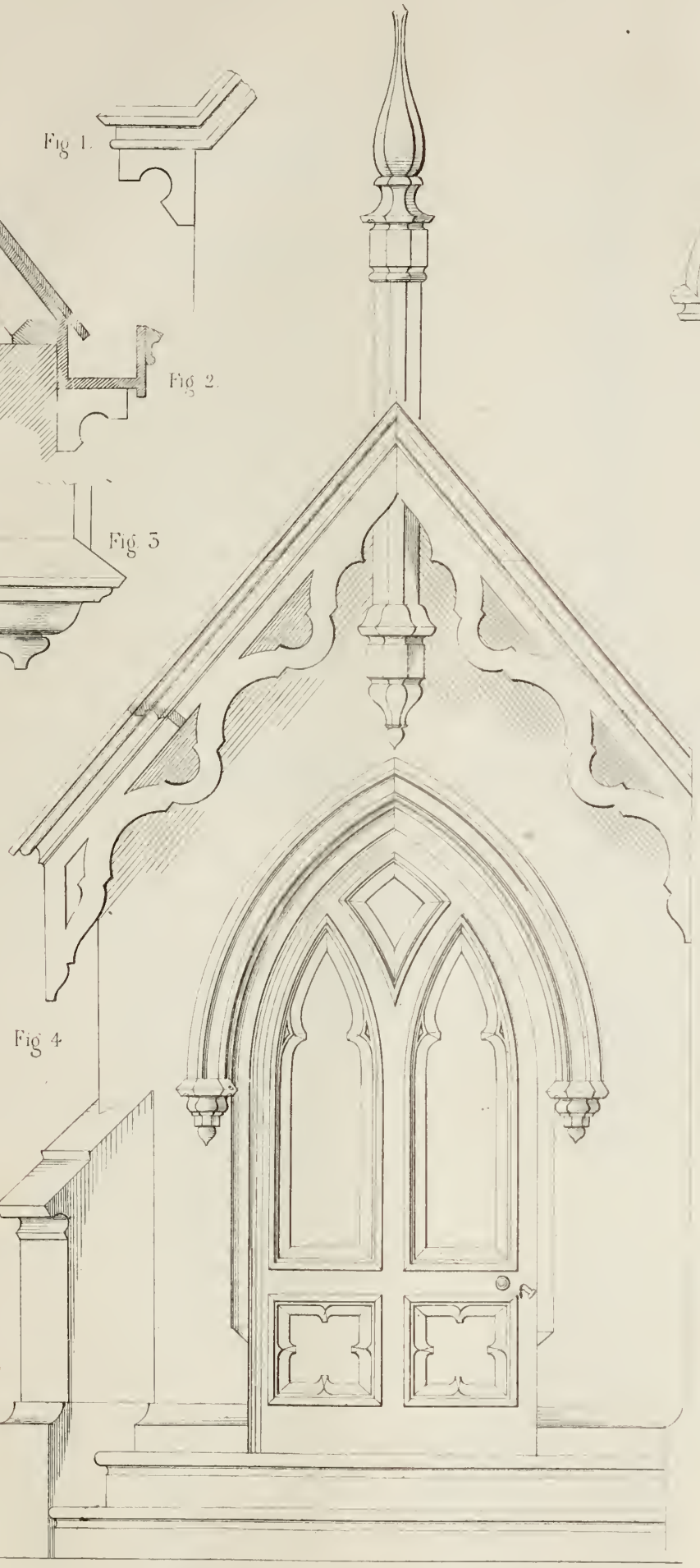


Fig 4

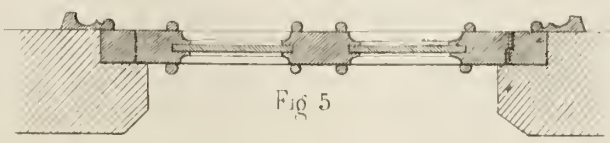


Fig 5

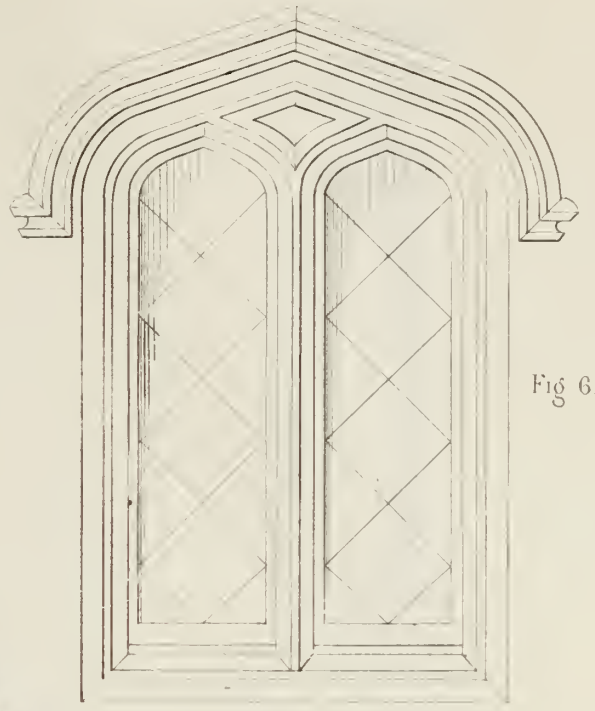


Fig 6.

Fig 7

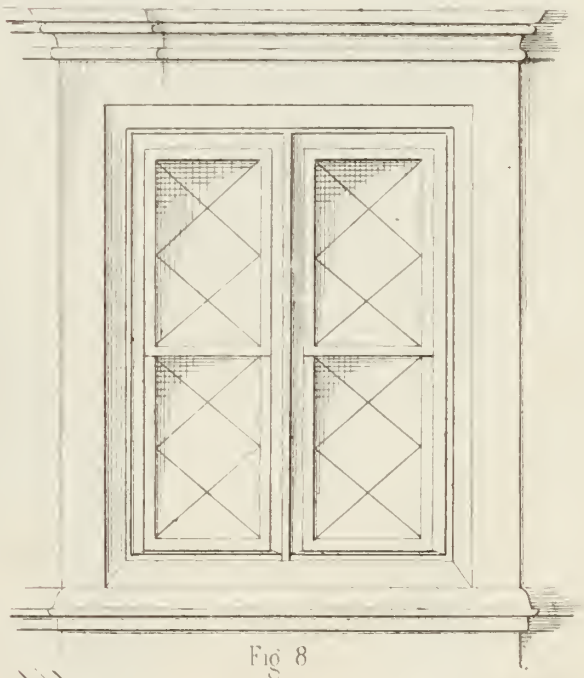


Fig 8

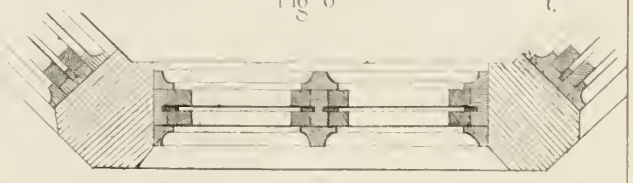


Fig 9

Scale $\frac{1}{2}$ inch to the foot.

Sam[l] Sloan Arch[t]

P. S. Duval & Co's Steam lith Press Phila[a]

DETAILS.

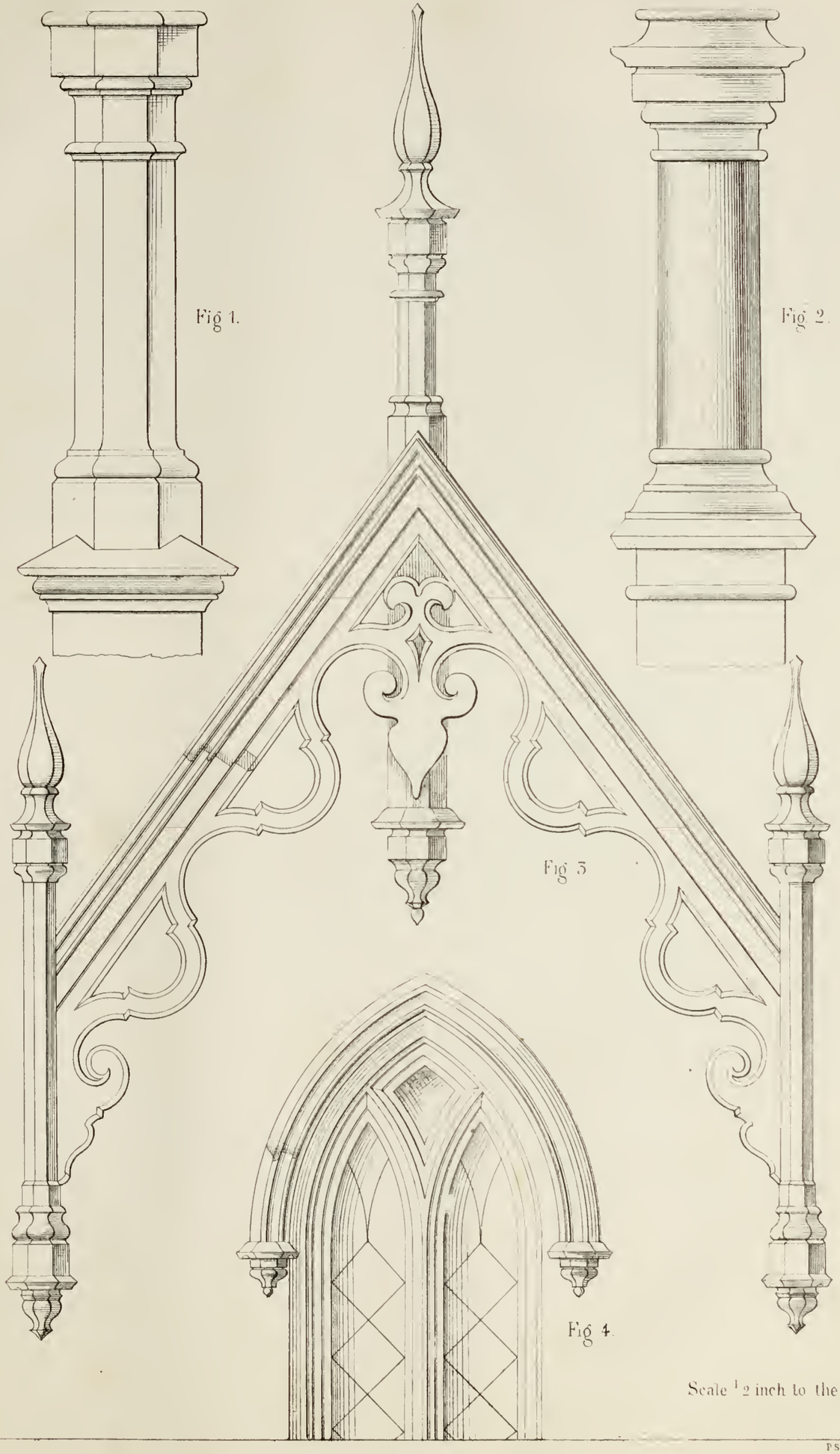


Fig 1.

Fig 2.

Fig 3

Fig 4

Scale $\frac{1}{2}$ inch to the foot

Sam[l] Sloan Arch[t]

P.S. Duval & Co's Steam lith. Press Philad[a]

DETAILS.

Flowering Maple which has the curled grain; but owing to the difficulty with which it is worked the Joiner uses it little. The Tulip Poplar, (*Liriodendron tulipifera*,) found every where, is a large tree one hundred feet high and four or five in diameter. The difference in the color of the wood, which is sometimes yellow and sometimes white, results from the soil; the yellow wood is best. It is fine-grained, compact, light, strong, stiff, easily wrought, polishes and takes paint well, but is very liable to shrink and warp. In the West the timber is much used for heavy framing, but is not so durable as other woods mentioned. The Locust is an excellent wood for sleepers, and also the Chestnut, either of which will outlast oak. Mahogany is a native of the West India Isles and the Bay of Honduras. The West India or Spanish Mahogany is most esteemed, and is excellent in joinery of every kind.

We have thus touched upon the most important timber trees of the United States, and refer for further accounts to the Silva Americana, by Michaux, to which we are indebted for many facts not obtained by personal observation. The general subject, Timber, will be continued in the next essay.

AN OLD ENGLISH COTTAGE.

DESIGN TWENTY-FOURTH.

THERE are characteristics about the Gothic cottages of England which entitle them to a rank separate from all others. We do not refer to those erected during the middle ages, but to those which sprang up in a thousand rural spots, suggested by returning good taste, after the mania for Renaissance had somewhat subsided. A cottage of this class comprised the several peculiarities which distinguished the different stages of older Gothic work, sometimes occurring in strong contrast, the whole being fashioned according to the fanciful wish or taste of the builder. These now form marked features in very many of the most beautiful landscapes of England which are unsurpassed in the world for their quiet rural effect. There is no style, perhaps, which better accords with a scene of meadows, streams, and silent woods, variegating a gently undulating surface. There are few such buildings in our land, and though we despise a servile imitation, yet we can but heartily wish that our countrymen would exercise some taste in locating as well as building their houses, and not place, as is often the case, a ghastly Roman palace in a quiet valley, beside a running stream.

We have endeavored to present a design, the side and front elevations of which occur on Plates XCVI. and XCVII. somewhat in the character of those mentioned above. Its decorative points need no mention. The walls are of stone rubble work, having rude quoins on all the corners. The roof is of slate, and the chimney tops of terra cotta ware which can be obtained of any desirable shape or size. The roof of the bay window should properly be of flag-stone.

The Ground Plans, Plate XCVIII. exhibit accommodations for a family of four or five, there being three chambers on the upper floor of ample size. The first floor contains the parlor, dining room and kitchen, with the pantry and scullery attached. The hall is lighted by the window opposite the landing in the second story. There is a fire-place in each apart-

ment. Throughout the base of the building there is a cellar, also exhibited on this plate, having stairs beneath the main stairway.

Plate XCIX. exhibits the Details of the front elevation. Fig. 1, is the cornice and bracket. Fig. 2, a section of the same showing the concealed gutter. Fig. 3, base of the window over the front porch. Fig. 4, front elevation of the porch. Fig. 5, section of the same. Fig. 6, window of the front gable. Fig. 7, section of the same. Fig. 8, front of the bay window. Fig. 9, section of the bay window.

Plate C. consists of the Details of the side elevation. Figs. 1 and 2, are chimney cans. Fig. 3, cornice and gable ornaments, (those of the front elevation are similar.) Fig. 4, gable window.

AN ORNAMENTED COTTAGE.

DESIGN TWENTY-FIFTH.

On Plate CI. is represented a Gothic front applicable to this design. It could not strictly be termed in this case a Gothic building, but by the term we only intend that the principal features are taken from the Gothic style. The walls are of brick or stone, rough cast without pointing. The roof is of slate, and the chimney stacks are of brick, also rough cast. The ornamented front below Plate CII. adapted to the same ground plan, is more in the bracketted style, and a tin roof is substituted for the slate. In this case the angles of the second story rooms are not cut off by the roof, the cornice being more elevated than in the other front.

Plate CIII. presents the Ground Plans of the design. On the second floor are four large chambers and a bed room, furnishing ample room for a family of five or six persons exclusive of the servants. On the first floor if the size of the family required it, the dining room might be used as a back parlor or sitting room, the present kitchen as a dining-room, and the laundry, being removed to an out house, might be used as a kitchen. The hall is to receive additional light by a window in the roof immediately over the well of the stairs. Beneath these stairs is a flight descending to the cellar.

Plate CIV. exhibits the Details of the Gothic front. Fig. 1, chimney stack. Fig. 2, base of the same. Fig. 3, details of the porch. Fig. 4, front door. Fig. 5, cornice and section of the bay-window. Fig. 6, section of the bay-window. Fig. 7, cornice, etc. of the gables. Fig. 8, gable window. Fig. 9, section of the window.

Plate CV. shows the details of the ornamented front. Fig. 1, chimney stack. Fig. 2, 3, and 4, details of the porch. Fig. 5, front balcony, cornice and finial. Fig. 6, section of the same through a. b. showing the bracket. Fig. 7, front window. Fig. 8, base and finish of the bay window.

Sam! Sloan Arch!

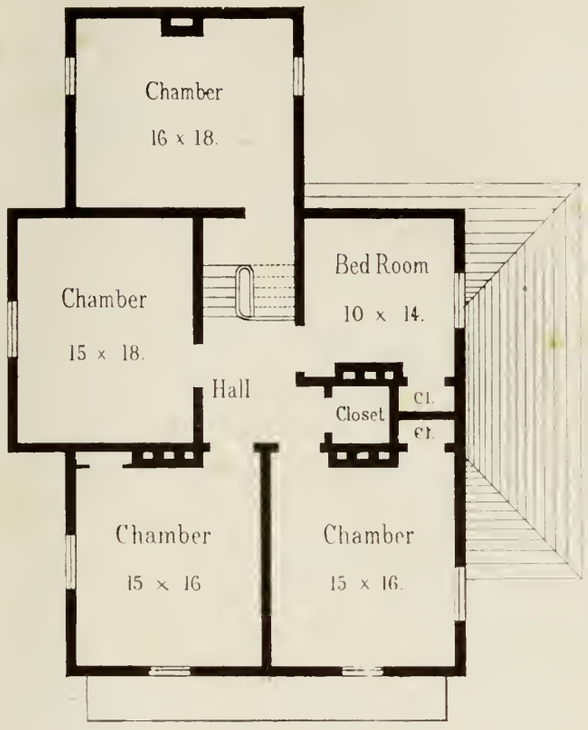
P.S. Duval & Cox Steam lith. Press, Phila.

A GOTHIC FRONT.

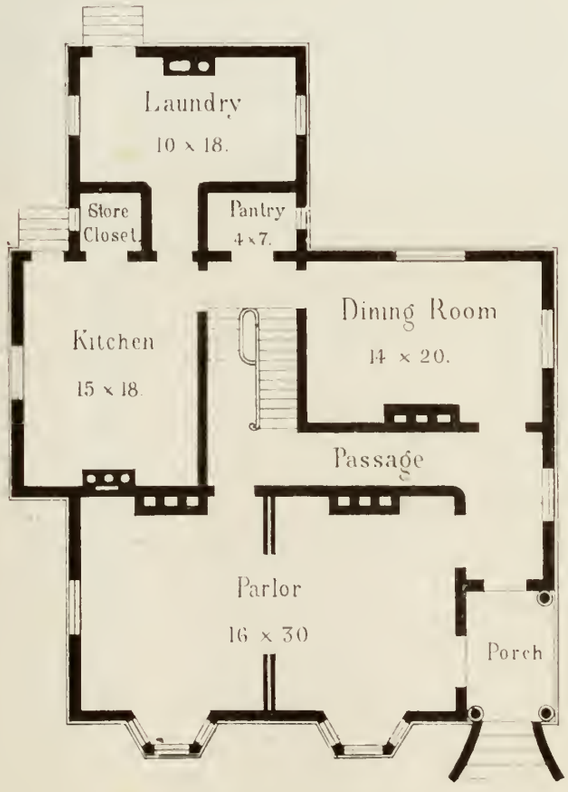
Sam! Sloan Arch!

P.S. Duval & Cox Steam lith Press, Philad.

AN ORNAMENTED COTTAGE.



SECOND FLOOR.



FIRST FLOOR.

Scale 12 feet to the inch

GROUND PLANS.

Fig. 1

Fig. 2

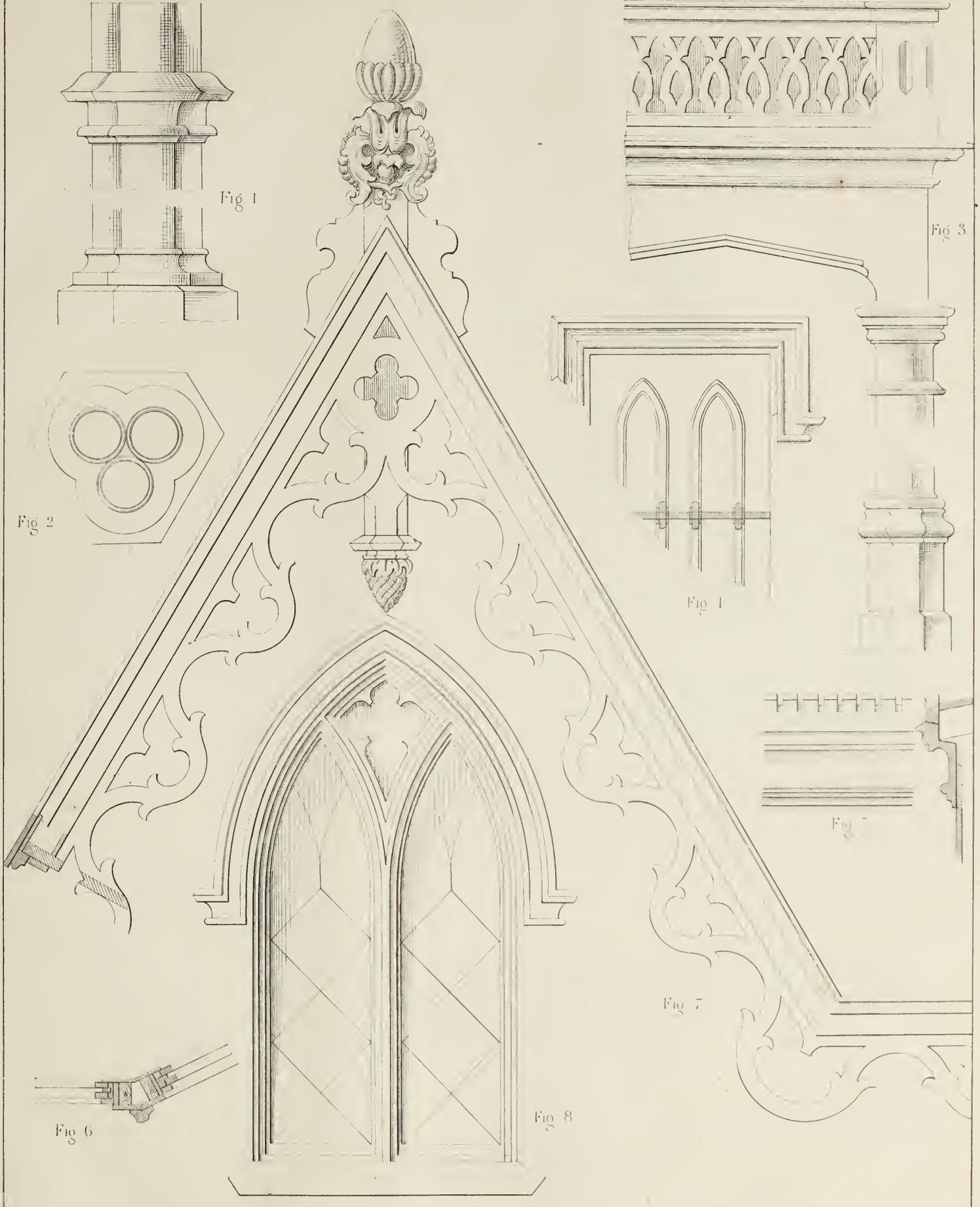


Fig. 3.

Fig. 4

Fig. 5

Fig. 7

Fig. 6

Fig. 8

Fig. 9

Scale $\frac{1}{2}$ inch to the foot.

Saml. Sloan Archt.

Lith. S. Duval & Co.s Steam Lith. Press Phila.a

DETAILS.

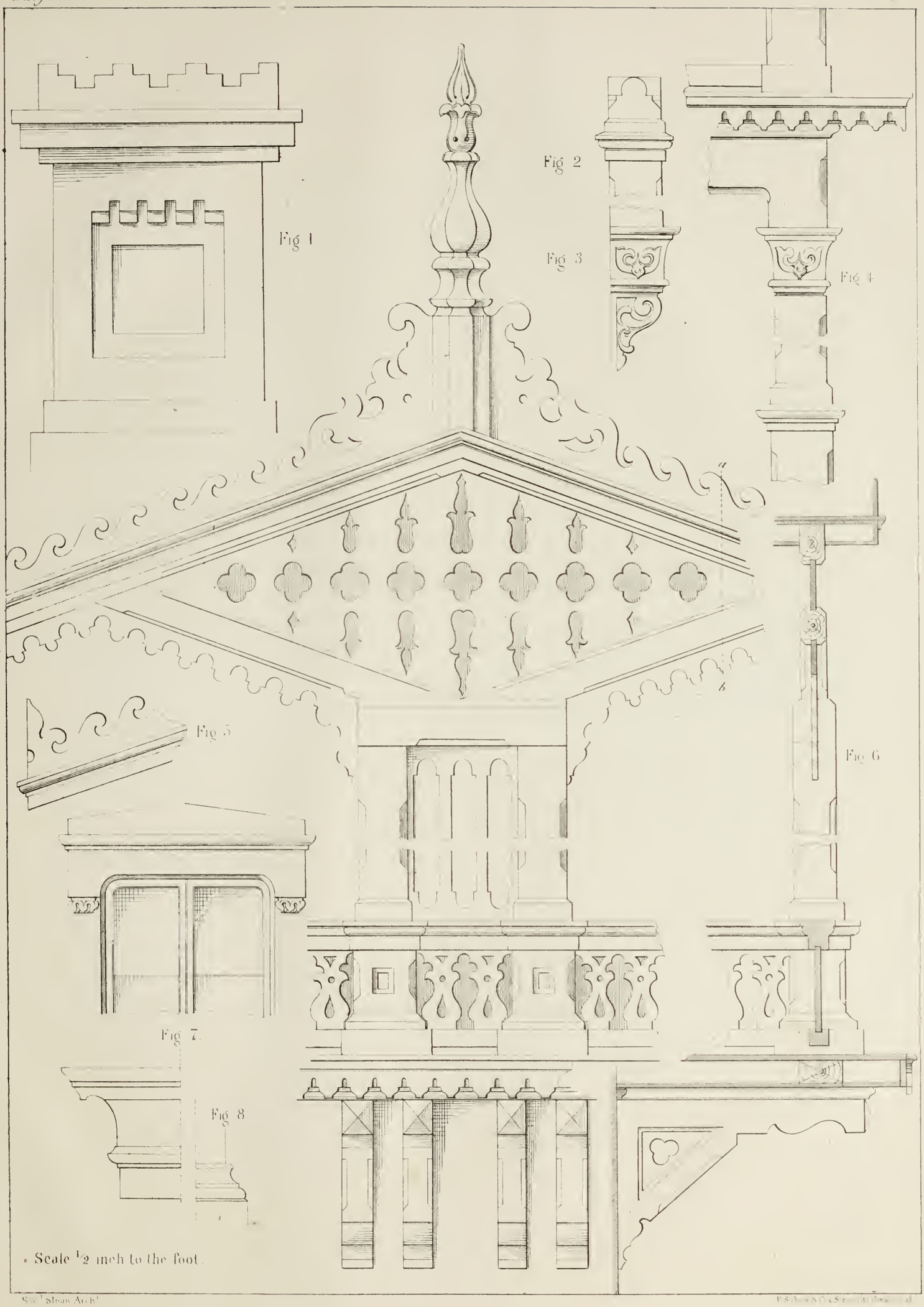


Fig 1
Fig 2
Fig 3
Fig 4
Fig 5
Fig 6
Fig 7
Fig 8
Scale 1/2 inch to the foot.

DETAILS.

A COUNTRY RESIDENCE.

DESIGN TWENTY-SIXTH.

THERE is no part of the world more beautifully diversified than our own country. It possesses every conceivable variety of scenery formed of mountains, rocks, hills and valleys, of undulating land and plains, of rivers, brooks and groves spread in endless combinations, beneath the cool grey skies of the North, and the warm sunshine of the South. The artist has here no want of studies, and it would be difficult indeed for him to imagine and depict a landscape, whose prototype might not somewhere be found in this vast magazine of natural beauties. To an architect also this affords especial delight, for when called upon to exercise his art in adding a new feature to the scene, he has only to look upon it with an eye that appreciates its excellencies and is at once enabled, as if by inspiration, to design that which will become the centre, irradiating life over the landscape, and receiving from it in return a full measure of nature's softening influence. True art and nature always blend in harmony. There may be contrast, but not discord. To produce this perfect mingling requires a high cast of intellect and sensitiveness seldom found, and hence successful attempts are so rare. This, however, should not deter others from making the effort, for if the highest point is not easily attained, we may approach it in a greater or less degree. It is to be regretted that the many natural advantages which our country affords are not more frequently made use of. We often see buildings designed and placed in utter disregard of the scenery, and sometimes an endeavor is made to force nature into a sort of accordance by terraces, embankments, altering the direction of streams, and other artificial arrangements. These things are repugnant to a refined taste, and it is far less offensive to see an unsuccessful effort to mingle with her charms.

There are other points, however, of greater importance perhaps than these. The comfort and convenience of a household should never be sacrificed to any other object. We love to see enthusiasm for art, but when it sacrifices these points, it steps from its true basis, and is no longer praiseworthy. Few persons are aware how much those essentials to a good dwelling, comfort and convenience, depend upon its locality, and how much may be added to them by laying hold of natural advantages. We have environed our last design in this volume by a landscape intended to illustrate a few of these points. Plate CVI. presents the scene. The building is supposed to face nearly south, in which position its three principal sides receive the sun light, the front being enlivened by it all the day. It is protected in the rear from the cold winds of the north-west and chilling storms of the north-east by a range of hills. These are also supposed to furnish the mansions and gardens with water, which may be easily so collected from the springs into pipes as to play in fountains and be carried into the highest apartment. These are two important matters; to have a fine healthful exposure, and an abundant supply of good pure water. In this perspective view are displayed the various accessories which may be found on a larger scale among the details. The summer house stands in the midst of the grove, and to the right more elevated is the observatory, from which we may readily conceive a fine extensive view.

Plate CVII. shows the front and side elevations of the design. Upon these are displayed the principal ornamental details sufficiently large, in a scale of sixteen feet to the inch. The conservatory, front porch, bay-windows and verandahs are of wood, and also the ornamental cornice. The front porch is designed as a carriage porch, the vehicle passing up the

grade beneath it and finding an exit from the other gate. The small attic windows may be seen over the front windows. The circular windows in the gables also light the attic rooms.

Plate CVIII. exhibits the plans of the first and second stories. There is a cellar beneath, in which the furnace will be placed for warming the building. The walls of the cellar are of stone, and those of the superstructure may be of brick rough-cast without pointing. The roof is of tin or galvanized iron. Next the vestibule, on the first floor, is a large ante room, so arranged with sliding doors that on occasion it may be thrown with the drawing-room and dining-room all into one. The kitchen and other offices are to the left. The second floor shows a range of chambers and bed-rooms sufficient for the accommodation of a large family. The front and east windows all reach the floor, giving access to the balconies over the bay-windows and the second story of the verandah. There is an attic story above also containing bed-rooms. The kitchen, bath-room, and all the chambers may be supplied with water from a reservoir on the hills in the rear, or if the location has not such advantages it may be received from a reservoir in the attic supplied by a force pump.

Plate CIX. shows the plan and front elevation of a garden house, the position of which may be found on the plate of the grounds. This building is approached on the sides by a covered arbor, the construction of which is also shown. It may be used for a variety of purposes, either as a gardener's hall, a museum, a billiard room or a place of resort for children. It will be found not only a highly decorative feature, but also really useful in such an extensive dwelling place. On this plate there is also a design for a vase to be placed wherever taste may suggest, and the details of the porch and cornice of the garden house are delineated on a larger scale.

Plate CX. exhibits a view of the observatory such as would occur in our design, which will be evident on examining the plate of the grounds already referred to. It is of wood, and perched on a mass of rough masonry, built against a rock. It is approached from the rear, starting in front where the foot of the hand rail appears, and going around up a flight of steps which land behind. The steps in front of the picture are stone, the rails are wood with stone posts, which furnish pedestals for marble or terra cotta garden figures.

Plate CXI. shows the summer house. This also is approached from the rear. It is composed of wood painted white, or if possible of marble, and is placed upon a mass of smooth masonry, as in the picture. This masonry might be rubble rough-cast, but in such situations the plaster is likely to fall off. This summer house is in the Romanesque style, which is well adapted to such situations, being without the ruggedness of the Tudor or the severe chasteness of the Grecian style.

Plate CXII. presents two designs for a carriage house and stable combined, the one on the left is that exhibited on the plate of the grounds, but the other if desirable may be substituted. Either it is believed will fully answer the purpose, but the one on the left being larger is more complete. The carriage is driven at once into the house, the horses are there unharnessed, and taken through the separating door into their stalls. There is of course a hay loft above.

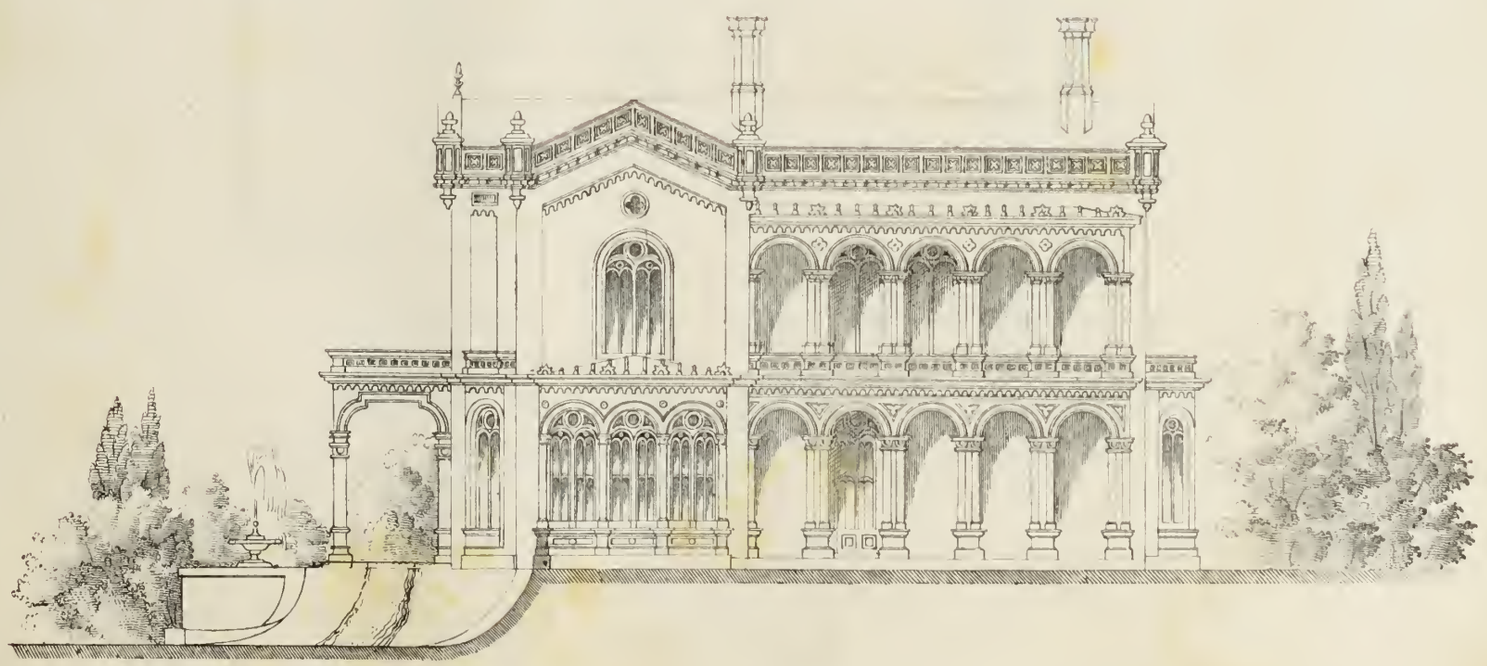
Plate CXIII. exhibits a vertical projection of the grounds. There is an ascent from the rear of the mansion towards the summer house, which may be seen in the perspective view, though not evident here. The mansion stands front. On the right is a flower garden, and beyond that is the arbor and covered way leading to the garden house. This building faces the large pool, which has a fountain in its centre, in the rear of the dwelling. By winding walks we reach the summer house with its fountain. To the right of this is seen the plan of the observatory, and the position of the steps leading to it. The view on plate CX. is taken from the foot of the steps lying between the observatory and the garden house. On the extreme left is the carriage house, shut off from the rest of the grounds by trees.

Sam.l Sloan Arch.t

P. S. Duval & Co.s Steam lith. Press Philad.a

A COUNTRY RESIDENCE.

FRONT ELEVATION



SIDE ELEVATION.

Scale 16 feet to the inch.

Sam[l] Sloan Arch[t]

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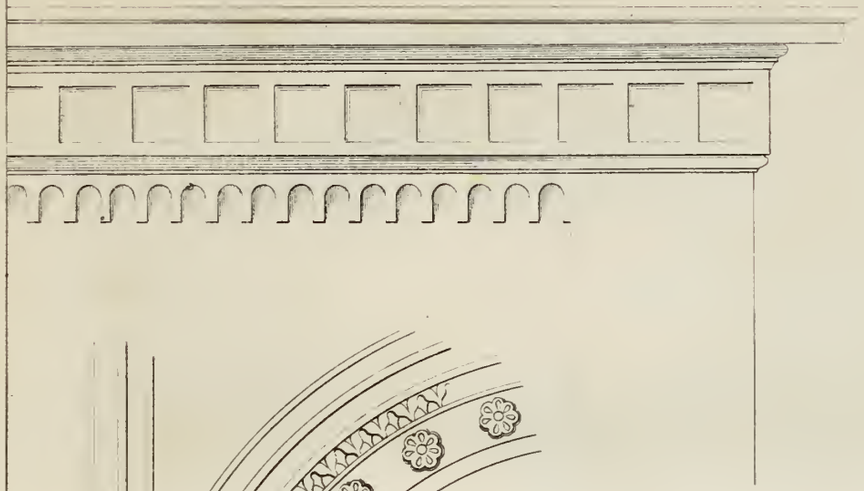
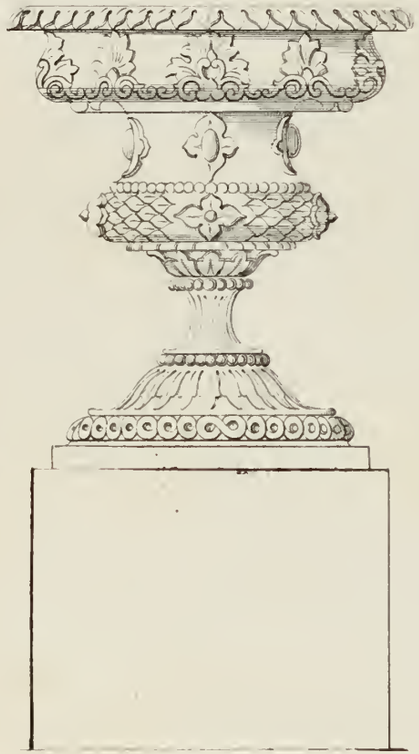
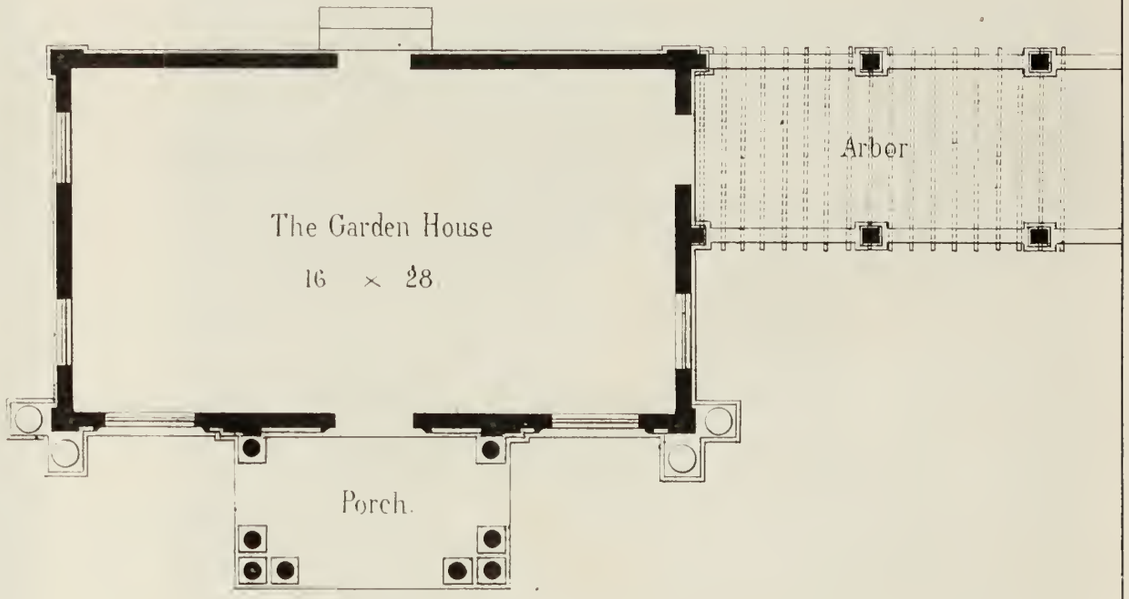


Scale ½ inch to the foot.



Scale of the Vase 1 inch to the foot

FRONT ELEVATION



DETAILS.

Scale 8 feet to the inch.

Sam.l Sloan Archt

T. S. Duval & Son Steam Lith. Press Phila.a

Saml. Sloan Archt.

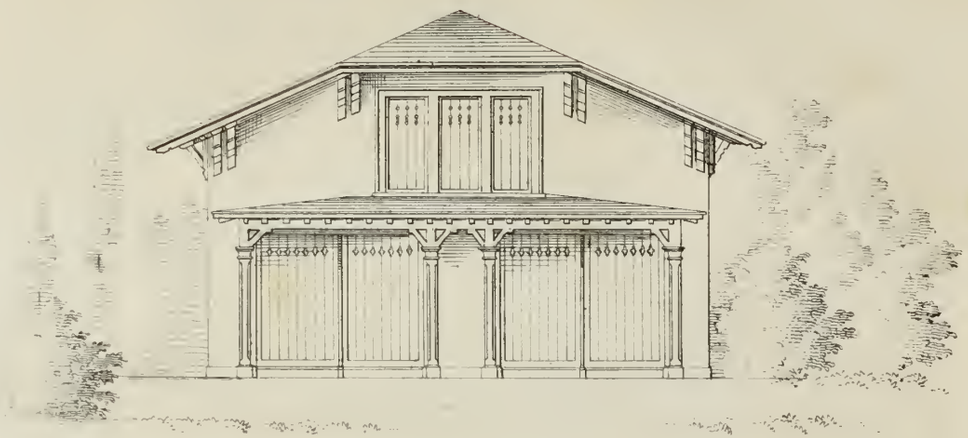
P.S. Duval & Co's Steam lith Press Philad.a

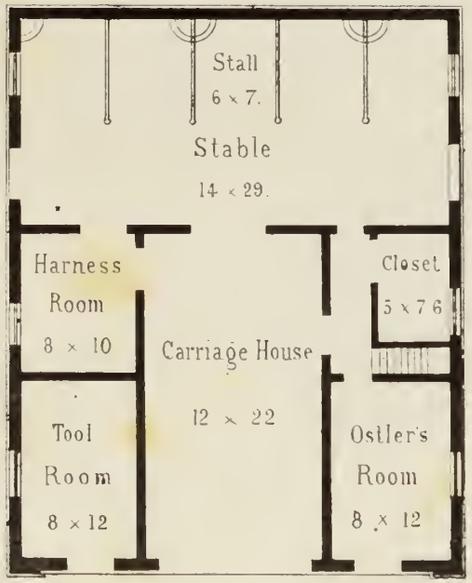
THE OBSERVATORY.

Saml. Sloan Archt.

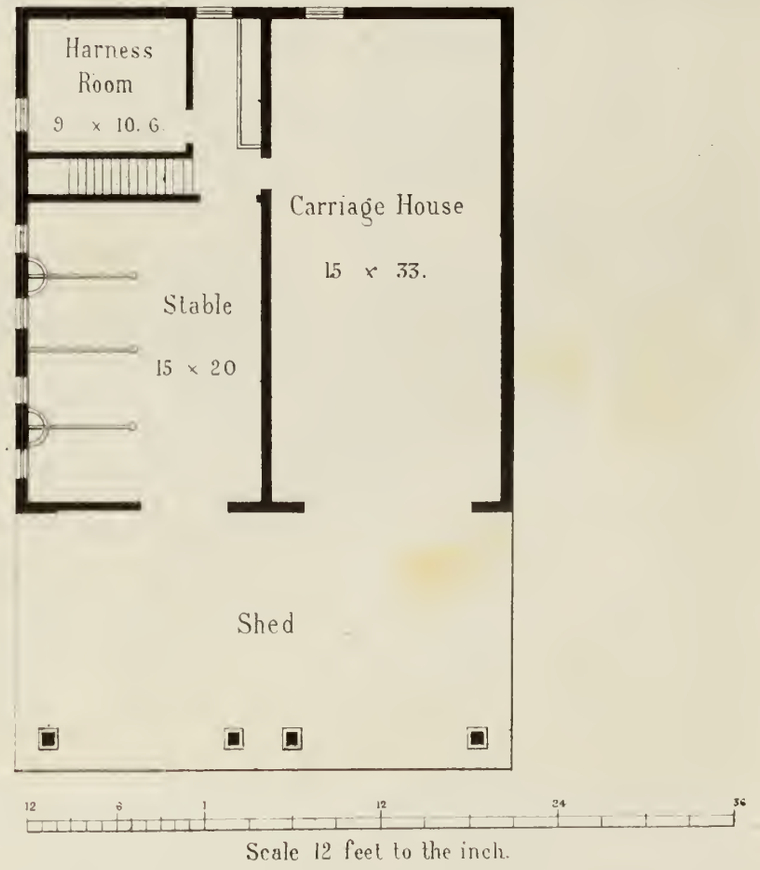
P.S. Duval & Co's Steam lith Press Philad.a

THE SUMMER HOUSE.





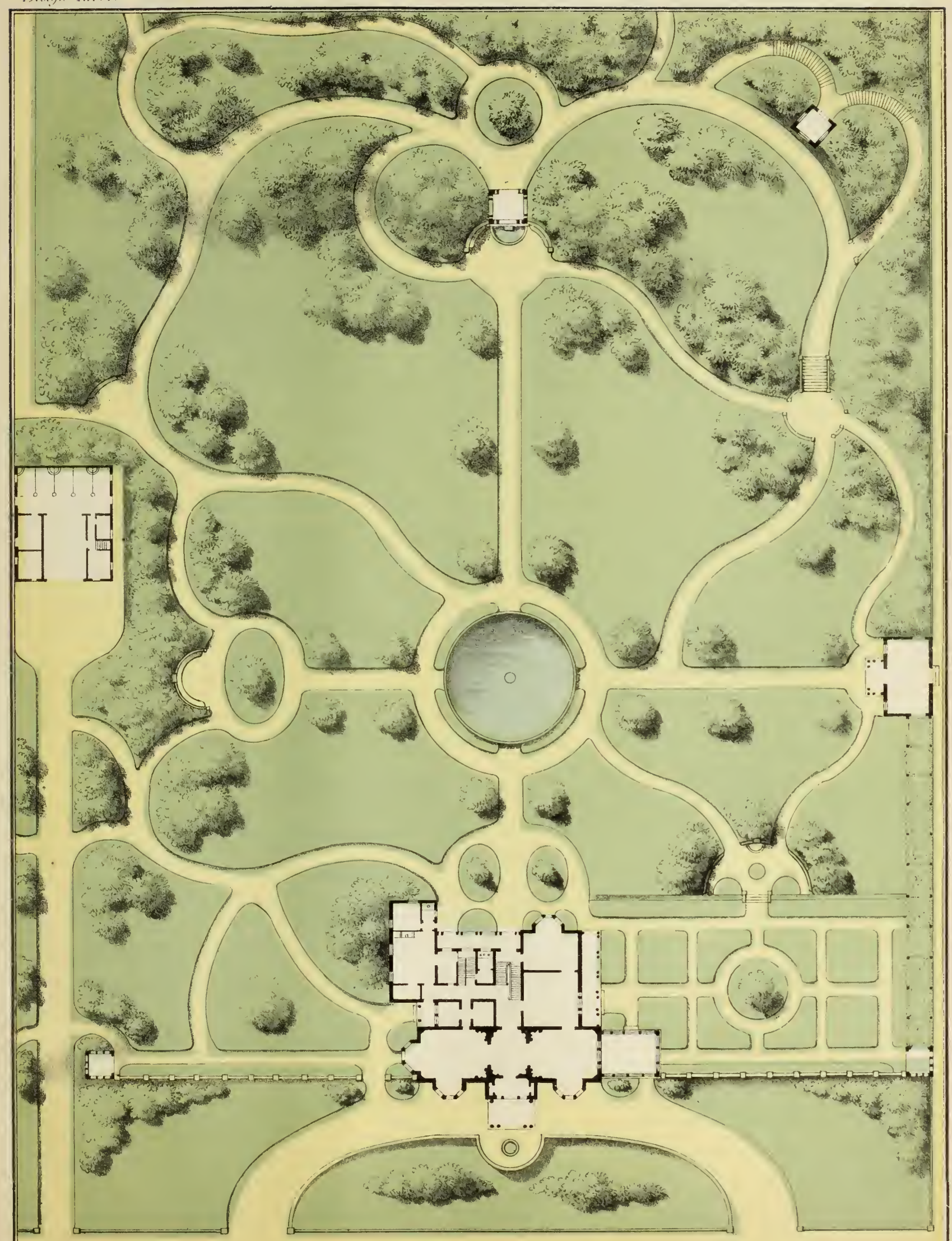
CARRIAGE HOUSES.



Scale 12 feet to the inch.

Sam' Sloan Arch'

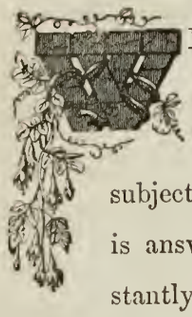
P.S. Duval & Cos Steam lith Press Philad'a



Scale 40 feet to the inch.

Sam^l Sloan Arch^t

A RETROSPECT.



WE are now about to close the first volume of this work, and it may not be improper to glance at what has been done before proceeding further. The undertaking was commenced with many misgivings, not only as to our own ability in accomplishing it, but also whether the subject was sufficiently popular to make it successful. In respect to the latter point, the question is answered. The success of the work exceeded our highest hopes, the demand has been constantly increasing, and it is now only a matter of wonder that the interest of the community in the subject could ever have been doubted. There are few persons, even those nursed in the lap of luxury, who have not at some time experienced discomforts arising either from insufficient accommodations or inconvenient arrangements in dwellings. There are many things that money will not buy. It cannot secure comfort in our homes if they be badly arranged, badly lighted, badly heated, or badly ventilated. These points must be secured in the first place, and even with them there is a great diversity of views respecting comfort. No one has greater cognizance of this fact than an architect. A dwelling in which one person would live with the utmost pleasure would render another uncomfortable and unhappy, simply because his education and habits are different. There are but few old homesteads in this country, which descendants take a delight and pride in holding. Our customs are continually changing, and our means improving, and hence what was once considered an elegant mansion is now a second or third rate dwelling. The style of building generally practised here, is by no means the most substantial, and at the same time our population is rapidly increasing. For these reasons every citizen is interested in the art of building, and each expects or hopes at some day to erect a dwelling for himself suited to his peculiar notions of living. He examines architectural works with interest, expecting to glean information from the professional man more extended and practical, than his own observation affords. We have endeavored to direct our work to meet this desire, and intend finally to leave nothing unsaid or undone, so far as we know, which may furnish the wished for information.

In the twenty-six preceding designs, we have confined the variations by those generally conceded ideas of comfort, which place the parlor in front, the domestic offices in the rear, and the sleeping apartments on the second floor. These seem to us by far the most natural arrangements, but they are very different in many other enlightened countries. Within these limits, we have given many various arrangements for apartments, some of which will certainly be adapted to almost any peculiar notions. But this point is by no means yet exhausted, and many other combinations will be contained in the next volume totally distinct

from those in this. We have given to the façades of these designs a considerable variety of style adapted to different tastes and locations. The greater number of these have been Italian and Gothic, interspersed with occasional Romanesque and fanciful designs, which last lay no claim to any particular style. Indeed, it is impossible to express in a small building the principles which strictly constitute a style. We can only make its few details consistent with each other. The designs are always accompanied by such data as will enable the builder to construct them without difficulty. In respect to the engraving, no one will hesitate to pronounce a decided improvement.

The letter press has received a full share of attention. There are short accounts of several of the different styles, giving a description of their rise and progress, and the principles on which they are based. The facts therein stated are collected from various sources, and though perhaps not expressed in the most fluent, graceful manner, are nevertheless reliable. Besides these, we have begun a series of articles, which are intended to comprise a succinct description of the building art accompanied by numerous collateral facts and reflections. We have entered but a little way into these subjects, their great extent not being compressible within our limits, but at the same time, we hope that much has been said which will be found useful and new.

The middle point is reached, and but half the labor is done. As yet there is no feeling of relaxation, but, on the contrary, a strong desire and determination not only to keep up the spirit of the work and render it complete, but to improve it in every practicable way. We now close the present volume, but at once open the next with the wish and hope of rendering it more valuable to its readers, and more creditable to all concerned in its production.

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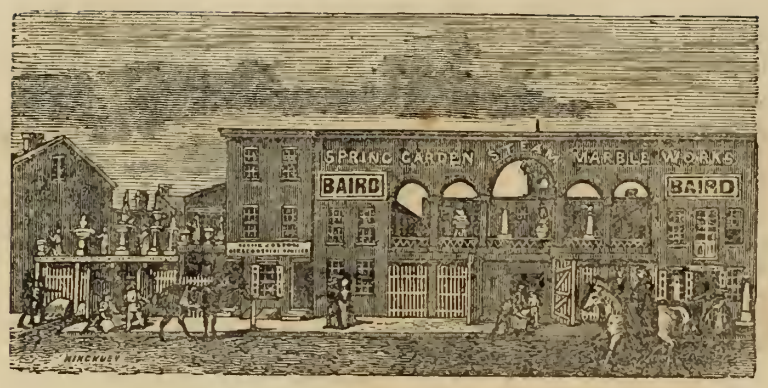

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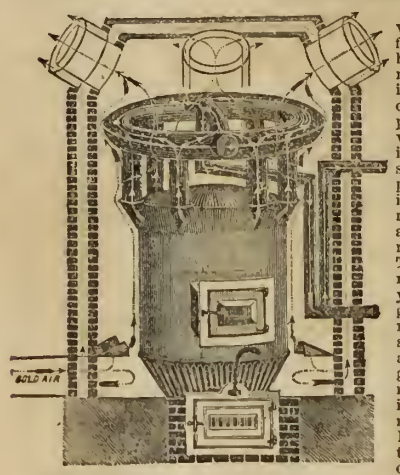

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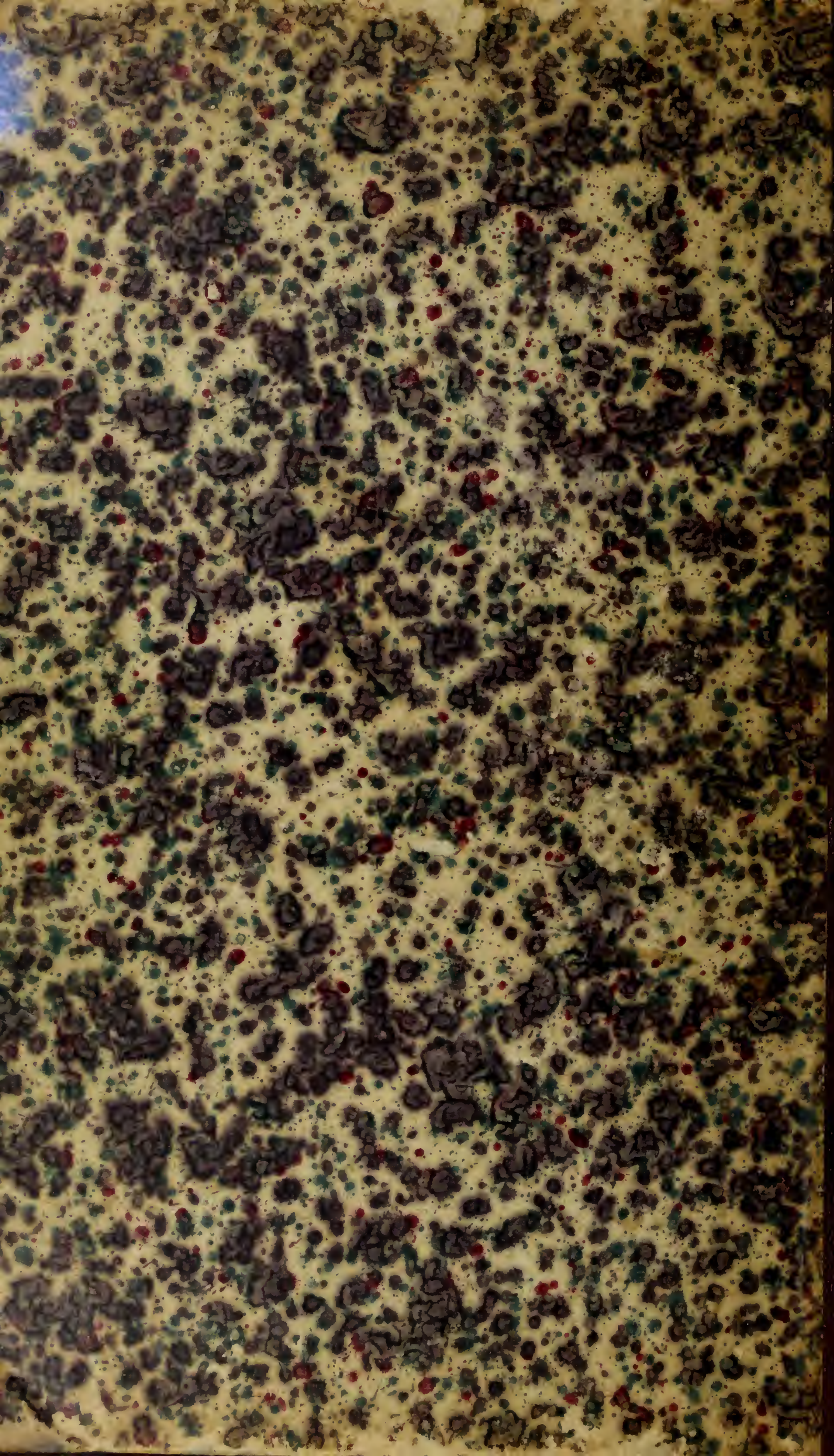
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